REPORT OF THE MYSORE AGRICULTURAL DEPARTMENT FOR THE YEAR ENDING 30TH JUNE 1933

WITH THE GOVERNMENT REVIEW THEREON.

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Government of his highness the Maharaja of Mysore.

GENERAL AND REVENUE DEPARTMENTS.

G. O. No. D. 3105-25—A. & E. 137-33-2, dated 30th December 1933.

Administration Report.

Reviews the —— of the Department of Agriculture for the year 1932-33.

READ—

Letter No. Per. 25 of 1933-34, dated 21st November 1933, from the Director of Agriculture, submitting the annual report of the Agricultural Department for 1932-33.

ORDER NO. D. 3105-25—A. & E. 137-33-2, DATED BANGALORE, THE 30TH DECEMBER 1933.

Recorded.

Dr. Coleman was in charge of the Department during the year except for two months and twenty-nine days when Mr. H. V. Krishnayya, Deputy Director of Agriculture at Headquarters acted for him.

Mr. H. V. Krishnayya retired from service on 8th December 1932 and in his place, Mr. A. K. Yegnanarayana Iyer, Deputy Director of Agriculture, Shimoga, was transferred to Bangalore.

Chemical Section.—The work of this section consisted of the continuance of the manurial experiments on the more important crops with valuable results. Compost manure has replaced cattle manure on the Sugar-cane Farms in the Irwin Canal area. Pot experiments of paddy and ragi also yielded valuable results.

Supervision of the manufacture of compost manure on the Mysore Sewage Farm and the investigation into the insecticidal value of 13 different kinds of plant material were continued. It is noted with interest that Honge oil resin soap compares very favourably with the fish oil resin soap as an insecticide and that it was arranged to be manufactured in the Government Soap Factory.

Mycological and Entomological Sections.—Work on the different kinds of spraying materials and appliances continued. About 20,000 acres of coffee were sprayed against leaf disease. Materials for spraying 9,000 acres of areca against koleroga were distributed to the areca garden owners. Two Co-operative Societies in Sagar and Sorab supplied spraying material to the garden owners within their jurisdiction. Government trust that more Co-operative Societies will undertake such work and relieve the Department to some extent. Experiments on Anaberoga of arecanut have shown that the disease can be produced by artificial inoculation and that it is the first step in the study of control measures. Groundnut and Honge oils have proved good spreaders in spray mixtures against coffee and areca and to have effective fungicidal properties and as a remedy for betel vine mildew.

It is satisfactory to note that paddy case worms were brought completely under control in the channel tracts of the French-Rocks Sub-Division by the timely adoption of the method of kerosining the water in the paddy plots and disturbing the plants systematically. Mundilia Suberosa has been found to be a very promising material for being used as insecticide.

Botanical Section.—Five new strains have been found promising for each of the Hain and Kar ragi tracts and three new strains of paddy were evolved for the Maidan on the Paddy Breeding Station at Nagenahalli and a similar number of strains for the Malnad on the Marthur Farm. Study of Doddahatti (cotton) was commenced in Singapur Kaval lands during the year.

The scheme for the breeding of thick varieties of sugar-cane subsidised by the Imperial Council of Agricultural Research was started during the year under report.

Agricultural Engineering and Education.—Government are glad to note that improved ploughs and cultivators manufactured by a local firm in Hassan have given satisfactory results. Development in this direction in other localities is highly desirable

and every encouragement should be given to local enterprise. All the four Agricultural Schools were popular. The management of the Hassan Agricultural School was transferred to the Hassan District Board.

Experimental Farms.—More than 400 acres of land comprising the Hebbal Rifle Range were added on to the Hebbal Farm bringing the total area of the latter to over 500 acres and 100 acres of the new land were brought under the plough.

Babbur Farm supplied seed cocoanuts and seedlings from the best palms to the public. Seedlings from seed nuts brought from Java are reported to have been planted during the year.

It is reported that special training courses in spraying and grafting methods were held on the Coffee Farm and that 21 estate writers and six maistries from private estates attended the course.

The Marthur Farm continued to supply cuttings from high yielding pepper vines and the Irwin Canal Farm supplied seed cane to raiyats in that area. Experiments on the irrigation requirements of sugar-cane are reported to have been in progress on the latter farm.

Demonstration and Propaganda.—Owing to the restricted grants by District Boards for demonstration purposes, the demonstration work was considerably curtailed. Nevertheless the sale of improved ploughs and sugar-cane mills showed an increase, the total of all implements sold being 4,775 against 3,097 in the previous year, of which 1,015 were new types of ploughs designed and made in the Central Industrial Workshop. About 685 pallas of new strains of ragi were distributed through the seed farms. Seven new areca driers were constructed during the year bringing the total number to 25. The Departmental Depots were popular and sold seeds and implements worth Rs. 1,17,805 as against Rs. 58,640 during 1931-32. Private estates were also inspected in connection with electrical pumping installations which are reported to be gradually increasing. Co-operative marketing of selection 69 cotton seed developed and cotton in pressed bales and seed was sold to the value of Rs. 27,225. Articles worth Rs. 19,718 were sold to Village Panchayets and Co-operative Societies.

A new circle with Mandya as Headquarters was created and placed under the charge of an Assistant Director of Agriculture for the purpose of inducing raiyats to cultivate sugar-cane and undertaking sugar-cane cultivation on Government land in the Irwin Canal area for supply to the Sugar Factory at Mandya. This is an important development tending to the expansion of sugar-cane cultivation in the Irwin Canal tract.

The following table shows the progress achieved in this respect up to the end of the year:—

Area of Government land planted	..	..	886 acres.
Area of raiyats' land planted	..	..	2,047 „
Cash advances made	..	..	Rs. 24,521—0—0
Implements supplied	..	..	„ 10,070-12—0
Manures supplied	..	..	„ 63,013—9—0

The scheme of the Imperial Council of Agricultural Research, *re* enquiry into the cost of cultivation of crops in the principal sugar-cane and cotton tracts in India, was started in the State during the year. Six villages have been taken up for this work in typical areas.

Financial.—A sum of Rs. 717 was collected towards oil cake arrears and Rs. 513 were written off leaving a balance of Rs. 5,808 still to be collected.

The work of the Department was on the whole quite satisfactory.

S. ABDUL WAJID,
Secretary to Government,
Development Department.

To—The Director of Agriculture in Mysore.
The Comptroller to the Government of Mysore.
The Revenue Commissioner in Mysore.
The Director of Industries and Commerce in Mysore.
The Registrar of Co-operative Societies in Mysore.
The Deputy Commissioners of Districts.
The Presidents of District Boards.

Exd.—C. K.

W D 1177—GPB—800—3-1-34

SUMMARY OF THE REPORT OF THE MYSORE AGRICULTURAL DEPARTMENT FOR THE YEAR ENDING 30TH JUNE 1933.

I was in charge of the Department during the year, except for 2 months and 29 days in July, August and September, when I was on leave and Mr. H. V. Krishnayya, Deputy Director, acted for me.

Mr. H. V. Krishnayya retired from service from 8th December 1932 after continuously serving in the Department from the beginning and Mr. A. K. Yegna Narayana Aiyar was transferred to Bangalore as Head-quarters Deputy Director.

In addition to my duties as Director of the Department, I was appointed as Managing Director of the Mysore Sugar Co., in January 1933. As a great deal of my time was taken up in the development and administration of the Company's affairs, I could not undertake the inspections and supervision of the Institutions of this Department to the same extent as in the past, and these had to be delegated to the Head-quarters Deputy Director.

Seasonal Conditions.—There was generally very heavy rainfall both in the Mungar and in the Hingar during the year and the seasons for most crops were good. Paddy and sugarcane very greatly benefited. Owing to heavy rains, areca suffered from Kole-roga even to the end of the season, but damage was kept down by general spraying. The Yields from coffee were normal to above normal. Yields from cotton and other dry crops were good generally. The later heavy rains caused considerable damage to the harvested crop of ragi, discolouring and otherwise making the grain less fit for seed purposes.

Both water and fodder for cattle were plentiful throughout the year.

Prices of Agricultural produce of all kinds except coffee and areca continued to rule very low hitting the agriculturists hard and reducing their purchasing power greatly. This has naturally affected the work of the Department in respect of the sale of agricultural implements, manures, and other articles to the extent that increases have not been large.

Chemical Section.—The Chemical Section continued during the year experiments already laid out on the different farms on the more important crops of the State such as Paddy, Sugar-cane, Ragi, Coffee and Arecanut. Manurial experiments on the Coffee Farm have indicated that with proper manuring the tendency for a bumper crop to be always followed by a poor crop can be largely mitigated, as a lean crop is followed only after two bumper crops. The results arrived at so far, are certainly valuable and afford considerable guidance in recommending schemes of manuring for coffee planters. The complete manures have given the highest yields. The areca manuring experiments on the Marthur Farm which have been in progress since 1926-27 have been brought together and interpreted by statistical methods and the conclusion that a garden once brought into good condition may be manured once in three years, is confirmed. The yields of sugarcane have also been shown to be capable of large increase by the use of a larger dose of sulphate of ammonia (5 Cwts. per acre). The value of compost manure has been demonstrated and this has taken the place of cattle manure on the large sugar-cane farms in the Irwin Canal area where some 2,500 tons have been used. Pot experiments of paddy and ragi have also yielded valuable results.

The Section continued to supervise the manufacture of compost on the Mysore Sewage Farm.

The Section also continued the investigations on 13 different kinds of plant material with regard to their insecticidal value and encouraging results have been indicated.

The work on the Honge Oil as an insecticide has led to important results and a Honge Oil and Resin Soap has been prepared which compares very favourably, with the Fish Oil Resin Soap, and was accordingly arranged to be manufactured in the Government Soap Factory.

Mycological Section.- -The study of important plant diseases has continued as well as work on the different kinds of spray materials and spraying appliances. The work of spraying of coffee against leaf disease was attended with great success and about 20,000 acres of coffee were sprayed during the year. Spraying against areca Koleroga was also very popular and spray materials for about 9,000 acres of areca were distributed to the areca garden owners. Two Co-operative Societies, one in Sagar and another in Sorab, undertook the supply of spraying materials to the garden owners within their jurisdiction. Work in connection with the Anaberoga of arecanuts has shown that we can produce the disease by artificial inoculation. This is the first step in the study of control measures.

Cheap vegetable oils such as groundnut oil and Honge oil were tried with very satisfactory results as spreaders in spray mixtures, used in spraying against coffee and areca diseases. The fungicidal properties of these oils was also tested as a remeby for betel-vine mildew and found to be quite effective.

Entomological Section.—The laboratory and field work have continued on the usual lines. Demonstrations against Avere Pod Borer pest were conducteb in 59 villages in the Districts of Bangalore, Kolar and Tumkur.

An important pest dealt with in the year on a large scale was the paddy case worms in the channel tracts of the French-Rocks Sub-Division. The timely adoption of the method of kerosining the water in the paddy plots and disturbing the plants systematically rendered the area completely free from the pest.

Against the coffee borer beetle, work was continued with tar washes.

The work with the sugarcane borer parasites was continued in the year, though it has been difficult to assess the exact reduction in damage produced by this method.

A number of different kinds of plant materials used generally as fish poisons have been continued to be investigated for their insecticidal value and Mundulia Suberosa has been found to be a very promising material.

The work of introducing bee-keeping in the State has been expanded and 75 colonies of bees were established in the year. The Entomologist also visited Ceylon for studies in connection with rearing of Queen Bees. The Section also undertook the training of youngmen in Bee-keeping methods.

Botanical Section.—For the Hain Ragi tract in addition to the strains H22 and H2, four new selections of dry land ragi and one of irrigated ragi have been found promising. For the Kar ragi tract, 16 strains were under study and five of them were found to be very promising ; and 40 pallas of seed of these were made available from the Kar Ragi Station. H.M. 320 sugar-cane the product of this Department, still continued, however, to lead and the whole of the Irwin Canal tract of nearly 3,000 acres is one solid block under this variety. Among Paddy varieties large quantities of three new strains evolved on the Nagenhalli Paddy Breeding Station which were found to yield higher than G.E.B.24 were distributed. Over two hundred selections of paddy were studied on the paddy Breeding Station. About 60 pallas of the three strains of S. 246, S. 12 and S.236 were raised and distributed. A number of other selections from the main varieties of paddy in the channel tracts of the State have been found promising and arrangements for the multiplication of the best strains were made on the Irwin Canal Farm. For the Malnad area, three new strains of paddy were found very promising amongst the pure strains tested on the Marthur Farm and these are being multiplied for seed purposes. Work on cotton has related to the raising of pure seed of selection 69 for the seed farms and to the production of new types by careful hybridization. For the study of Doddahatti a small farm was opened in Singapur Kaval lands and the comparative trials of the different strains were commenced during the year.

A scheme subsidized by the Imperial Council of Agricultural Research for the breeding of the thick varieties of sugarcane came into force in the year, the work being under the control of the Economic Botanist. Considerable progress has been made in the planting of thousands of seedlings and the trial of varieties both on the Hebbal Farm and the Irwin Canal Farm.

Engineering Section.—Ploughs manufactured by the Cooper Engineering works and certain local manufacturers were tested for their fitness for Mysore conditions.

Improved ploughs and cultivators made in Hassan by a local firm were tested and found fairly satisfactory and were recommended for sale.

A large number of jaggory boiling outfits for improved furnaces were made in the Hebbal Workshop for distribution. The new seed drill designed by the Department was used for large scale trials. Cheap honey extractors have been designed and made in the Hebbal Workshop for distribution and a type costing only Rs. 6 was designed and supplied for test. A bullock-drawn implement for putting up field bunds has been designed with a view to cut down the cost due to manual labour.

Agricultural Instruction.—The Hebbal Agricultural School had a total strength of 84 in the three classes. From the final year, 29 students sat for the examination and 21 passed. The School is increasing in popularity and there are 100 students on the roll in the current year. The Vernacular School at Chikkanahalli, Hassan and Ramakrishnapur also had a successful year. The Hassan Agricultural School has recently been transferred to the management of the Hassan District Board.

Experimental Farms.—The area of the Hebbal Farm was increased from about 100 acres to over 500 acres by the addition of the Hebbal Rifle Range. About one hundred acres out of the new land were brought into cultivation. In addition to the breeding work already referred to, experiments on manurial and varietal tests were conducted on ragi, groundnuts, paddy and sugar-cane.

On the Babbur Farm, the supply of seed cocoanuts and seedlings from the best palms to the public was commenced in the year and nurseries were put down for raising seedlings from the very best trees for future planting on the Farm. Seedlings raised from seed nuts brought from Java from trees reputed to have given very high yields were planted out in the garden during the year.

Work on pepper on the Marthur Farm was extended to supplying a large number of cuttings from the high yielding vines to garden owners. Ginger and pine apples and the newly planted coffee on the Marthur Farm have been thriving very well and promise to be a profitable introduction in that area.

Spraying experiments on the coffee farm have led to a marked increase in the area sprayed by planters and in the use of hose type of sprayers on the larger estates. Researches by the Scientific Officer have led to the discovery of two strains of leaf diseases which behave differently and to quicker methods of testing resistence to disease of coffee plants in the seedling stage itself. Special training courses in spraying and grafting methods were held and 21 Estate Writers and 6 Maistries from private estates attended the course.

On the Irwin Canal Farm, the whole cane crop of 200 acres was cut and supplied for seed purposes in that tract. This area was ratooned, the ratoon showing a remarkably good stand ; a further 140 acres was planted bringing up the area under standing cane to 340 acres. Manurial experiments demonstrated the value of compost and also that no special manuring is required with potash on these soils. Experiments on the irrigation requirements of sugarcane have been in progress.

Demonstration and Propaganda.—The District Work has continued on the usual lines ; but owing to restricted grants for demonstration purposes by the District Boards by the Department itself, the demonstration of improved implements, jaggory boiling and other improvements could be carried on only to a small extent. Nevertheless, the bulk of the work in respect of the supply of improved implements, seeds of different crops, manures, inspections of estates and other items has not suffered. The sale of implements on the other hand has improved ; the number of improved ploughs sold rose from 901 last year to 1,657 in the present year ; the number of improved sugarcane mills likewise rose from 34 in 1931-32 to 52 in 1932-33 ; and the total of all implements rose from 3,097 to 4,775. The popularization of the new types of ploughs designed and made in the Central Industrial Workshop was very satisfactory, the number of ploughs sold during the year being 1,015.

The total quantity of improved strains of ragi distributed through the A & B type seed farms was 684.69 pallas.

The work on the construction of areca driers in the Shimoga Malnad was further developed and 7 new driers were constructed bringing the total constructed to 25. The scheme of taccavi loans for the purchase and supply of artificial manures for paddy sanctioned for the Yedatore and other channel tracts in Mysore was availed of by

ryots and manure worth Rs. 537-8-0 was supplied in the year under the scheme. The Agricultural Inspector's depots continued to be popular and the sale of seeds and implements amounted to Rs. 1,17,805 as against Rs. 58,640 in the previous year.

The District Staff undertook the inspection of estates in connection with electric pumping installations, which are now gradually increasing.

The area under Selection 69 cotton further increased in the year, the acreage being 32,622 acres or nearly 50 per cent of the cotton area of Chitaldrug. Co-operative marketing of selection 69 cotton also developed and cotton in pressed bales and seed was sold by the Maradihalli Co-operative Society to the value of Rs. 27,225 in the year against Rs. 19,000 in the previous year.

Work in co-operation with Village Panchayets and Co-operative Societies, though somewhat restricted owing to the stringent financial condition, was continued and articles to the value of Rs. 19,718 were sold to these bodies.

Sugar-cane cultivation for the Sugar Factory.—The development of outstanding importance in the year is the expansion in the cultivation of sugar-cane in the Irwin Canal tract and the work in connection with the Sugar Factory at Mandya. A new Assistant Director's Circle was created in Mandya with a special staff for the purpose of inducing ryots to cultivate sugar-cane and undertake sugar-cane cultivation on Government land, with a budget of Rs. 3,32,200 the amount including a sum of Rs. 1,00,000 for being advanced to ryots for seed, manures, implements and cultivation expenses. The actual progress to the end of the year under all heads is given below :—

Area planted on Government land, Kodihalli Mallagere and Satnur, Ganadal.					Acres 886		
Do	by Ryots	..	..		2,047		
					Rs.	a.	p.
Cash advances	..	..	..	..	24,521	0	0
Implements supplied	..	..	..	..	10,070	12	0
Manures supplied	..	..	..	..	63,013	9	0

Cost of Cultivation Enquiry.—An important scheme sanctioned during the year under the auspices of the Imperial Council of Agricultural Research and started towards the end of the year under report relates to the Enquiry regarding the Cost of Cultivation of Sugarcane and Cotton. The scheme is to continue for 3½ years, the cost of Rs. 16,030 being borne by the Council. Six villages have been taken up for the work in typical tracts throughout the State, each in charge of a Village Investigator. The work is supervised by a District Supervisor under the general direction of the Deputy Director of Agriculture at Headquarters.

Central Implement Depot.—The total sales of implements during the year amounted to Rs. 51,000 against Rs. 46,000 in the previous year. The new type of K.M. and Mysore pattern ploughs have become popular, the sales being 1,015 against 155 in the previous year.

Financial.—The collection of oil cake arrears during the year amounted to Rs. 1,230 including Rs. 513 written off the accounts leaving a balance still to be collected of Rs. 5,808 as against the sum of Rs. 7,038 shown in the last year's report.

A. K. YEGNANARAYANA IYER,
For *Director of Agriculture.*

REPORT OF THE MYSORE AGRICULTURAL DEPARTMENT FOR THE YEAR ENDING 30TH JUNE 1933.

PART I.

I returned from leave and took charge of the Department on 29th September 1932.

Mr. H. V. Krishnayya, Headquarters Deputy Director retired from service during the year. Mr. Krishnayya has served continuously in the department ever since its inception, and has on several occasions acted for me as Director. I take this opportunity of recording my appreciation of his great ability and loyal service to the department during this long service.

Mr. A. K. Yegnanarayana Iyer, Deputy Director of Agriculture, Shimoga Circle, was transferred to Bangalore as Headquarters Deputy Director.

After the formation of the Mysore Sugar Co., Ltd., in January 1933, I was appointed as Managing Director of the Company in addition to my duties as Director of the Department, and since that date and also long prior to it during the preliminary work connected with the Company, I have had to devote much of my time and attention to the development and administration of the Company's affairs. It has not been possible for me therefore to undertake the inspections and supervision of the institutions of this department to the same extent as in the past and these duties have consequently had to be delegated to the Headquarters Deputy Director of Agriculture.

SEASONAL CONDITIONS.

The year was one generally of very heavy rainfall both in the Mungar and in the Hingar. With the exception of the Kar ragi areas where the distribution was not favourable, the seasons for most crops have been very good. Paddy and sugar-cane have been greatly benefited, and in the case of the former, it was possible to raise both Karthik and Vaisak crops. In the case of areca, on account of heavy rain, Koleroga persisted even towards the end of the season but damage was kept down by general spraying. For coffee although the blossom showers were small and at intervals and blossoming was somewhat uneven, the yields were normal to above normal. Cotton yields were good, as likewise all dry crops generally. The later rains were too heavy for ragi and considerable damage resulted to the harvested crop discolouring and otherwise making the grain less fit for seed purposes.

Both water and fodder for cattle were plentiful throughout the year.

Prices of agricultural produce of all kinds except for coffee and areca continued to rule very low making it very hard indeed for Agriculturists to fulfil their money commitment and reducing their purchasing power greatly. This has naturally affected the work of the department in respect of the sale of agricultural implements, manures and other articles to the extent that increases have not been large but it is noteworthy that in spite of the depression there has been increased sales under certain heads.

CHEMICAL SECTION.

The Chemical Section continued during the year experiments already laid out on the different farms on the more important crops of the State such as paddy, sugar-cane Ragi, Coffee and Arecanut. Manurial experiments on the Coffee Farm have indicated that with proper manuring the tendency for a bumper crop to be always followed by a poor crop can be largely mitigated, as a lean crop is followed only after two bumper crops. The results arrived at so far are certainly valuable and afford considerable guidance in recommending schemes of manuring for coffee planters. The work is however, being continued the blocks having been rearranged in the year to eliminate

the side effect of the outer rows. The complete manures have given the highest yields, while in the special series Niciphos proved best with sodium nitrate and Ammonium sulphate coming next in order, as sources of nitrogen, superphosphate proved best as a source of phosphoric acid, with basic slag coming second and on the potash series, potassium chloride has proved most suitable. The studies of the soil reactions on coffee were continued but no significant conclusion could be drawn yet. The areca manuring experiments on the Murthur Farm which have been in progress since 1926-27 have been brought together and interpreted by statistical methods and the conclusion that a garden once brought into good condition may be manured once in three years is confirmed. The yield of sugarcane has also been shown to be capable of large increase by the use of a larger dose of sulphate of ammonia (5 cwts. per acre). The value of compost manure has been demonstrated and this has taken the place of cattle manure on the large sugar-cane farms in the Irwin Canal area. Pot experiments on the water requirements of ragi and the manurial requirements of paddy and ragi have also yielded valuable results. In the pot experiments on ragi, the complete manure with the ratios of nitrogen, phosphoric acid and potash as 2 : 3 : 2 has been found the best on the ordinary red soils and this is the ratio now being generally recommended. The pot experiments on the water requirements of ragi again brought out the fact that the manured pots were those that used up the least quantity of water in proportion to the dry weight of the plant material produced.

The section continued to supervise the manufacture of compost on the Mysore Sewage Farm and the Department has furnished an outlet for the large quantities manufactured and has used on the Irwin Canal Sugar-cane Farms about 2,500 tons.

The Section also continued the investigations on 13 different kinds of plant material with regard to their insecticidal value, and encouraging results have been indicated.

In the case of the Mundolia suberosa, the water extract of the material has itself been found to have insecticidal value and as the active principles giving it this property cannot be " Rotenone " which is insoluble in water, its exact nature is being investigated. The work on the Honge oil as an insecticide has led to important results and a Honge oil and Resin Soap has been prepared which compares very favourably with the Fish Oil Resin soap, and was accordingly arranged to be manufactured in the Government Soap Factory. This work has been carried on in co-operation with the Entomological Section.

Mycological Section.

The study of important plant diseases has continued as well as work on the different kinds of spray materials and spraying appliances. The important feature of the year has been the success which attended the work of spraying of coffee against leaf disease. It is estimated that an area of 20,000 acres of coffee was sprayed in the year in the Mysore State. Spraying against areca Koleroga was also very popular and spray materials for about 9,000 acres of areca were distributed to the areca garden owners. Two Co-operative Societies, one in Sagar and another in Sorab, undertook the supply of spraying materials to the garden owners within their jurisdiction. Spraying against early blight of potatoes caused by Alternaria was done in ten villages in Bangalore and Kolar Districts. The question of a combined spray against early blight and the potato beetle is under investigation. Work in connection with the Anaberoga of arecanuts has shown that we can produce the disease by artificial inoculation. This is the first step achieved in the study of control measures.

A promising line of work undertaken during the year with vary satisfactory results was the utilisation of cheap vegetable oils such as groundnut oil and Honge oil as spreaders in spray mixtures used in spraying against coffee and areca diseases. The fungicidal properties of these oils was also tested as a remedy for Betelvine mildew, and they have been found to be quite effective.

Entomological Section.

The laboratory and field work have continued on the usual lines. Remedial measures against Kamblihula pest were not found necessary to the usual extent, probably as the result of the intensive campaign against the pest during the last several years. Demonstrations against Avere Pod Borer pest were conducted in 59 villages in the Districts of Bangalore, Kolar and Tumkur. Spraying against the Epilachna beetle

pest on the potato crop was conducted on a large scale this year and a total of 33 acres was sprayed in the taluks of Bangalore and Kolar with very good results.

An important pest dealt with in the year on a large scale was the paddy case worms in the Channel tracts of the French Rocks Sub-Division. The timely adoption of the method of kerosening the water in the paddy plots and disturbing the plants systematically rendered the area completely free from the pest.

Against the coffee borer beetle, work was continued with tar washes imported from Bengal as the last year's work with Bhadravati wood tar was found very effective and as the latter was not available this year.

A 10 per cent emulsion of the tar with a higher boiling point gave a 30 per cent mortalitoiy of the larvae in the tunnels. Certain propriety materials like Pysect, Sulfocide, and Nicotine Sulphate were also tried but found to be of no penetrating or larvacidal effect. The Bhadravati tar emulsion work conducted last year was found to have had 66 per cent effect, judged by the number of affected trees pulled out.

The work with the sugarcane borer parasites was continued in the year, though it has been difficult to assess the exact reduction in damage produced by this method. No reliable results could be reported from the release of 14,000 Trichogramma parasites last year.

A number of different kinds of plant materials used generally as fish poisons have been continued to be investigated for their insecticidal value and Mundulia Suberosa has been fuund to be a very promising material, a method of its general use is being worked out in collaboration with the Biochemist. Hongey oil has been found to be of much value as an insecticidal base and a special soap with Hongey oil and resin and one without resin have been made according to the formulas furnished by the Department in the Government Soap Factory and their use as a spray against the green bug pest on coffee has been tested on the Government Coffee Farm during the year. Tests with other vegetable materials have been continued. the seed of the custard apple was found, among these to possess considerable tonic properties.

The work of introducing bee-keeping in the State has been expanded and 75 colonies of bees were established in the year. The Babbur Farm was found to be a very suitable centre for this work and the colonies on the Farm have been thriving very well. The Entomologist also visited Ceylon for studies in connection with rearing of Queen Bees. The section also undertook the training of youngmen in Bee-keeping methods.

Botanical Section.

The work of breeding important varieties of the main crops was continued on the different Farms and several new strains of much promise have been evolved and the multiplication of the best strains for supply of seed was continued. For the Hain Ragi tract in addition to the strains H22 and H2, four new selections of dry land ragi and one of irrigated ragi have been found promising. For the Kar ragi tract, 16 strains were under study and 5 of them were found to be very promising and 40 pallas of seed of these were made available from the Kar Ragi Station. Among sugarcanes, a large number of varieties including much famed canes from Java and Coimbatore were under study. H. M. 320 the product of this Department still continued however to lead and the whole of the Irwin Canal tract of nearly 3,000 acres is one solid block under this variety. Among the groundnuts, H. G. 1 was largely distributed and Valencia was found to be a desirable introduction as an early ripening crop. Breeding work has also been carried on with reference to other crops like potatoes, castor, avare and fodder grasses. Among paddy varieties large quantities of three new strains evolved on the Nagenhalli Paddy Breeding Station which were found to yield higher than G.E.B. 24 were distributed. Over two hundred selections of paddy were studied on the Paddy Breeding Station. About 60 pallas of the three strains of S. 246, S. 12 and S. 236 were raised and distributed. A number of other selections from the main varieties of paddy in the channel tracts of the State have been found promising and arrangements for the multiplication of the best strains were made on the Irwin Canal Farm. For the Malnad area, three new strains of paddy were found very promising amongst the pure strains tested on the Marthur Farm and these are being multiplied for seed purposes. Work on cotton has related to the raising of pure seed of selection 69 for the seed farms and to the production of new types by careful hybridization.

Two varieties were tested for wilt resistance and were found to be quite useful. For the study of Doddahatti, a small farm was opened in Singapur Kaval lands and the comparative trials of the different strains were commenced during the year.

A scheme subsidized by the Imperial Council of Agricultural Research for the breeding of the thick varieties of sugar-cane came into force in the year, the work being under the control of the Economic Botanist. Considerable progress has been made in the planting of thousands of seedlings and the trial of varieties both on the Hebbal Farm and the Irwin Canal Farm.

Engineering Section.

Ploughs manufactured by the Cooper Engineering Works and certain local manufactures were tested for their fitness for Mysore conditions.

An experiment to test the effect of coating the wearing parts of ploughs with the hard alloy called "Stellete" which is said to give a hard wearing skin to iron parts was conducted by the Agricultural Engineer and shares coated by this alloy were obtained from the Central Industrial Workshop and were tested against both imported and locally made shares usually supplied. The results showed no improvement at all in wear due to the special coating.

Improved ploughs and cultivators made in Hassan by a local firm were tested and found fairly satisfactory and were recommended for sale.

A large number of jaggery boiling outfits for improved furnaces were made in the Hebbal Workshop for distribution. The new seed drill designed by the Department was used for large scale trials. Cheap honey extractors have been designed and made in the Hebbal Workshop for distribution and a type casting only Rs. 6 and much cheaper than the one manufactured last year was designed and supplied for test, and a bullock-drawn implement for putting up field bunds has been designed with a view to cut down the cost due to manual labour. As usual, the work of supervising machinery on all the farms, execution of building works and looking after the instruction in the Hebbal Agricultural School have been attended to in addition to inspection of estates for advice regarding the use of pumping machinery. The Agricultural Engineer also undertook the ploughing of an area of 52 acres by tractor plough for the Military Department and others.

Agricultural Instruction.

The Hebbal Agricultural School had a total strength of 84 in the three classes. From the final year, 29 students sat for the examination and 21 passed. The School is increasing in popularity and there are 100 students on the roll in the current year. The Vernacular Schools at Chikkanahalli, Hassan and Ramakrishnapur also had a successful year. The Hassan Agricultural School was transferred to the management of the Hassan District Board.

Experimental Farms.

The area of the Hebbal Farm was increased from about 100 acres to over 500 acres by the addition of the Hebbal Rifle Range. About one hundred acres out of the new land were brought under cultivation. In addition to the breeding work already referred to, experiments on manurial and varietal tests were conducted on Ragi, Groundnuts, Paddy and Sugar-cane. Ragi green-manured with sunhemp yielded 52 per cent more than the cattle manure plots. Limed plots of groundnuts also gave higher yields than the unlimed plots. In the paddy manurial experiments plots manured with hongey leaf and a mixture of 150 lbs. of Ammonium Sulphate and 335 lbs. of superphosphate gave the highest yields. In the sugar-cane trials, H.M. 320 gave an average yield of 46 tons per acre.

On the Babbur Farm, the supply of seed cocoanuts and seedlings from the best palms to the public was commenced in the year and nurseries were put down for raising seedlings from the very best trees for future planting on the Farm. Seedlings raised from seed nuts brought from Java from trees reported to have given very high yields were planted out in the garden during the year. Arrangements were made to supply

improved bee-hives with colonies from the Babbur Farm. Twenty lbs. of honey was extracted valued at Rs. 1-8-0 per lb.

Work on pepper on the Marthur Farm was extended to supplying a large number of cuttings from the high yielding vines to garden owners. Ginger and pine apples and the newly planted coffee on the Marthur Farm have been thriving very well and promise to be a profitable introduction in that area.

Spraying experiments on the Coffee Farm have led to a marked increase in the area sprayed by planters and in the use of hose type of sprayers on the larger estates. D. S. P. sprayers to the value of Rs. 35,000 were supplied to parties. Researches by the Scientific Officer have led to the discovery of two strains of leaf diseases which behave differently and to quicker methods of testing resistence to disease of coffee plants in the seedling stage itself. The Coffee Station held special training courses in spraying and grafting methods and 21 estates writers and 5 maistries were sent by planters for training. Breeding and propagation by grafting progressed satisfactorily. From all the farms, large quantities of seeds of improved varieties of the different crops have as usual been distributed.

On the Irwin Canal Farm, the whole cane crop of 200 acres was cut and supplied for seed purposes in that tract. This area was ratooned, the ratoon showing a remarkably good stand ; a further 140 acres was planted bringing up the area under standing cane to 340 acres. Varietal and manurial tests on sugarcane were conducted, and H. M. 320 variety proved the most satisfactory both in respect of yield and freedom from borer attack. Manurial experiments demonstrated the value of compost and also that no special manuring is required with potash on these soils. Various different varieties of paddy were also tried as rain-fed and summer crops as well as other rotation crops like wheat, cotton and groundnuts. Experiments on the irrigation requirements of sugar-cane have been in progress. Three sugarcane farms for raising sugar-cane for the Sugar Factory were opened in Kodihalli, Mallegere and Satnur progress in which is referred to in para 2 of page 13.

Demonstration and Propaganda.

The District Work has continued on the usual lines ; but owing to restricted grants for demonstration purposes by the District Boards and by the Department itself, the demonstration of improved implements, jaggory boiling and other improvements could be carried on only to a small extent. Nevertheless, the bulk of the work in respect of the supply of improved implements, seeds of different crops, manures, inspections of estates and other items has not suffered. The sale of implements on the other hand has improved ; the number of improved ploughs sold rose from 901 last year to 1657 in the present year ; the number of improved sugarcane mills likewise rose from 34 in 1931-32 to 52 in 1932-33 ; and the total of all implements rose from 3097 to 4775. The increase as regards ploughs and cultivators was largely due to the increased sales in the Irwin Canal tract consequent on the credit sales permitted under the sugarcane development scheme. The popularization of the new types of ploughs designed and made in the Central Industrial Workshop as referred to in the last year's report was very satisfactory. Their work has been much appreciated and the reduction in price has also been in their favour. The number sold of the K.M. type and Mysore Pattern ploughs was 1015.

The distribution of improved strains of ragi through the A & B type seed farms suffered somewhat on account of the heavy rains at harvesting time which affected the quality of the seed grain and made it difficult to obtain large supplies of seed ragi, sufficient to meet the demand. The total quantity of seed ragi distributed was 684·69 pallas.

The work on the construction of areca driers in the Shimoga Malnad was further developed and 7 new driers were constructed bringing the total constructed to 25 since the work was started. The scheme of taccavi loans for the purchase and supply of artificial manures for paddy sanctioned for the Yedatore and other channel tracts in Mysore was availed of by ryots and manure worth Rs. 537-8-0 was supplied in the year under the scheme. The expansion of the area under the new varieties of cane in all the four circles continued in the year and special attention was paid to the work. The Agricultural Inspector's depots continued to be popular and the sales of seeds, implements amounted to Rs. 117,805 as against Rs. 58,640 in the previous year. This large

increase being due principally to the sale of seeds and implements in the New Mandya Circle.

The District Staff undertook the inspection of estates in connection with electric pumping installations, which are now gradually increasing and the previous investigation by this department of the possibilities of success of prospective installations by this Department is a welcome feature.

The area under Selection 69 cotton further increased in the year, the acreage being 32,622 acres, or nearly 50 per cent of the cotton area of Chitaldrug. Co-operative marketing of seelction 69 cotton also developed and cotton in pressed bales and seed was sold by the Maradihalli Co-operative Society to the value of Rs. 27,225 in the year against Rs. 19,000 in the previous year.

The expansion of the district work in the Irwin Canal area and the constitution of a new circle at Mandya consequent on the development of sugar-cane cultivation and the opening of a Sugar Factory is referred to separately under para 1 in page 13.

Work in co-operation with Village Panchayets and Co-operative Societies though somewhat restricted owing to the stringent financial condition was continued and articles to the value of Rs. 19,718 were sold to these bodies.

Sugarcane cultivation for the Sugar Factory.

The development of outstanding importance in the year is the expansion in the cultivation of sugarcane in the Irwin Canal tract and the work in connection with the Sugar Factory at Mandya. In order to ensue the large area of cane in a compact blocks necessary for the purpose of a factory, special measures have been taken which have been pushed forward very energetically. A new Assistant Director's circle was created in Mandya with a special staff for the purpose of inducing ryots to cultivate sugar-cane and undertake sugar-cane cultivation on Government land, with a budget of Rs. 3,32,200 the amount including a sum of Rs. 1,00,000 for being advanced to ryots for seed, manures, implements and cultivation expenses. Sugarcane cultivation on Government land was undertaken on three large farms, *viz.*, Kodihalli, Malligere and Satnur. The supply of seed which consists almost entirely of the variety H.M. 320 was derived from the Irwin Canal Farm mainly and a strenuous campaign was carried through. The result has been the somewhat unique spectacle of an area of nearly 3,000 acres of cane, all of almost one single variety, planted and manured in one method on land also prepared in similar manner and all in a tract where the cultivation of cane is itself new. The actual progress to the end of the year will be found in the report of the Mandya Circle, but as the cultivation programme for the first crushing season is completed, the figures under all heads are given below :—

					Acres.		
Area planted on Government land, Kodihalli, Malligere and Satnur, Ganadal.					886		
Do	by Ryots	..	..	..	2,047		
					Rs.	a.	p.
Cash advances	..	..	..	..	24,521	0	0
Implements supplied	..	..	..	..	10,070	12	0
Manures supplied	..	..	..	..	63,013	9	0

A further area has been planted since the close of the official year bringing the total to over 3,000 acres.

Cost of cultivation Enquiry.

An important scheme sanctioned during the year under the auspices of the Imperial Council of Agricultural Research and started towards the end of the year under report relates to the Enquiry regarding the cost of Cultivation of Sugar-cane and Cotton. The scheme is to continue for 3½ years the cost of Rs. 16,030 being borne by the Council. Six Villages have been taken up for the work in typical tracts throughout the State, each in charge of a Village Investigator. The work is supervised by a District Supervisor under the general direction of the Deputy Director of Agriculture at Head-Quarters.

Live Stock Section.

The Amritmahal Department was merged in the Live Stock Section of the Department, in the reorganisation ordered in Government Order, No. D. 322-89—Agri. 64-30-14, dated 16—17th July 1931, during the year and the report of that department therefore forms part of the report of the Live Stock Section and ceases to be issued separately.

The number of Amritmahal herds was reduced from 15 to 11 during the year. One Range was abolished completely and another partly effecting a savings of Rs. 5,892. The demand for the year under all sources of revenue was Rs. 56,618-6-10 as against Rs. 58,111-13-1 in the previous year. The collection amounted to Rs. 38,167-13-4.

The scheme of aiedd cattle breeding sanctioned by Government was given effect to in the year under report and eight breeders were selected to whom 800 cows, 199 calves and 8 bulls were sold, and an area of 16,000 acres of kaval leased out. The anticipated financial realisation of the scheme will be about Rs. 25,840 out of which the first instalment of Rs. 7,737-12-0 was collected. A further annual income of Rs. 1,600 for the lease of the kavals is expected as also a net reduction of Rs. 5,852 in the expenditure of the Amritmahal budget. Under the scheme sanctioned by Government for supplying Amritmahal bullocks for training to the several farms, 67 pairs were supplied. The scheme of having a sub-station at Abbanaghatta for the rearing of all male calves from the main station is pending orders of Government.

Three thousand, three-hundred and fifty acres and 9 guntas of kaval were set free for cultivation and surrendered to the Revenue Department in the year and a further surrender of 23,963 acres is proposed.

From the Cattle Breeding Station at Ajjampur, 55 breeding bulls in all inclusive of 36 animals waiting to be taken delivery of by Panchayats were sold in the year to the Village Panchayets. The total strength of live stock was 873 head against 736 in the previous year and the health and condition of the cattle was very satisfactory. Special feeding experiments on the Farm which were referred to in the last year's report go to show that not only improvement in growth but also early maturity is brought about by the feeding of concentrates.

Sixty-three of the animals on the farm were protected against rinderpest by the new method of inoculating with goat virus, as part of the experiment undertaken in the year at the Serum Institute and subsequent tests with Bovine virus on these animals show that protection had resulted.

From the sheep farms 13 cross-bred rams have been supplied. Disease continued to be serious and the herds have been shifted to suitable better centres on the different farms.

The Kolar Sheep Breeders' Association sold 15,427 lbs. of wool. The membership of the Association rose from 180 to 192.

The joint sale of the wool of all the flocks was arranged for as usual but the prices having fallen nearly 60 per cent the realization were greatly reduced. The wool was however sold in grades, which resulted in better prices than otherwise would have been the case.

Central Implement Depot.

The total sales of implements during the year amounted to Rs. 51,000 against Rs. 46,000 in the previous year, which is an encouraging feature in view of the prevailing depression. The new type of K.M. and Mysore pattern ploughs have become popular, the sales being 1,015 against 155 in the previous year.

Dasara Exhibition.

The department organized as usual an extensive show demonstrating the work achieved and in progress in its different sections, at the Dasara Exhibition in Mysore.

Financial.

The collection of oil-cake arrears during the year amounted to Rs. 1,230 leaving a balance still to be collected of Rs. 5,808 as against the sum of Rs. 7,038 show in the last year's report. Most of this amount represents the sum which may be almost

considered very difficult or impossible to recover for various reasons and pertain to periods as long ago as 1916-17 ; nevertheless, every effort is being made through the Revenue Department to collect them.

Conclusion.

In spite of the very difficult time that our Agriculturists have been passing through and the need for retrenchment felt everywhere, the work of the Department has progressed in practically every direction, though not to the extent one could wish for. In respect of the extension of sugarcane cultivation the progress has more than come up to my expectations. These results are certainly due, in a large measure, to the zeal and energy of the staff of the Department to all of whom I express my great appreciation.

LESLIE C. COLEMAN,
Director of Agriculture.

Charge.—Dr. Leslie C. Coleman was in charge of the Department as Director of Agriculture from 29th September 1932 (on which date he returned from combined leave) to the end of the year.

Mr. H. V. Krishnayya, Deputy Director of Agriculture at Head quarters officiated as Director from 1st July 1932 to 28th September 1932.

Mr. K. Bhima Rao continued to act as Head quarters Assistant to the Director of Agriculture from 1st July 1932 to 16th January 1933 with a short break of ten days from 28th September 1932 to 8th October 1932.

Mr. A. K. Yegna Narayana Aiyar, Deputy Director of Agriculture, Shimoga Circle was transferred as Head quarters Deputy Director to the Director of Agriculture from 16th January 1933 and continued as such to the end of the year.

Mr. H. V. Krishnayya Officiating Director reverted as Deputy Director at Head-quarters from 29th September 1932 to 8th October 1932 from which date he was granted privilege leave for two months preparatory to retirement.

Tours.—The Director, the Officiating Director, The Deputy Director at Head-quarters and the Head quarters Assistant to the Director were on tour for 61,12,37 and 9 days respectively during the year.

Meetings Attended :—

1.	Legislative Council	2
2.	Representative Assembly Sessions	1
3.	Development Committee Meetings	5
4.	Krishnarajasagara Working Committee Meetings	4
5.	Miscellaneous	30

The Director visited Cawnpore and the Sugar Factory at Belapur in November 1932 to consult expert opinion in connection with the proposed starting of a Sugar Factory in Mysore.

INSPECTIONS.

(*a*) Offices, Farms and Schools.

Director.	*Offg. Director.*	*Deputy Director at Head-quarters.*	*Headquarters Assistant.*
Irwin Canal Farm	Ramakrishna Krishi Sala	Babbur Farm	.. Bhadra Colony.
Nagenhalli Farm	Mandya and Satanur Farms	Irwin Canal Farm.	
Belehonnur Farm	Hunsur Kar Ragi Farm	Ramakrishnakrishi Sala.	
Agricultural School, Hassan	Yellachihalli Sheep Farm	Assistant Director's Office,	
Kodihalli	Jeevanarayanakatte Farm	Tumkur.	
Satanur.		Bhadra Colony.	
Malligere Farm.		Assistant Director's Office Mysore and Shimoga.	
		Cattle Breeding Station, Ajjampur.	
		Assistant Director's Office, Chikmagalur.	
		Hassan Agricultural School, Marthur Farm.	
		Chemical Section	
		Entomological Section	
		Botanical Section	
		Mycological Section	
		Live Stock Expert	
		Superintendent, Civil Veterinary Department.	
		Superintendent, Serum Institute and Balehonnur.	

(*b*) Agricultural Depots.

Hassan	....	....	..
Channapatna	....	....	..

(*c*) Veterinary Dispensaries and Hospitals.

Saklespur	....	....	..
Hassan	....	....	..
Arsikere	....	....	..

Leave to Gazetted Officers.

1. Mr. S. Daniell, Assistant Director of Agriculture, Tumkur Circle was on Privilege leave for 15 days from 1st to 15th August 1933.

2. Mr. A. K. Yegna Narayana Aiyar, Deputy Director, Shimoga was on combined leave from 27th May 1932 to 25th November 1932.

3. Mr. C. Ellappa Chetty, Assistant Director, Shimoga was on combined leave from 27th October 1932.

4. Mr. N. Sampath Iyengar, Acting Agricultural Chemist was on four months leave (Privilege leave for 12 days from 1st July 1932 and furlough on full average salary for three months and 18 days from 28th January 1933).

5. Dr. B. Narasimha Iyengar was on privilege leave for one month from 27th October 1932 to 27th November 1932 and again for 35 days from 30th January 1933 to 6th March 1933.

6. Mr. B. Lakshmipathi, Assistant to the Live-Stock Expert continued to be on leave during the whole of the year.

Library.

Accessions to the Library were as follows :—

Journals and Periodicals	1188
Bulletins and Circulars	998
Reports	146
Books purchased	10

The number of periodicals acquired by subscription or otherwise were as hereunder :—

By Subscription	55
By Exchange	48

The number of books lent out to persons unconnected with the Department during the year was 135

The number of Cards indexed 1393

One hundred and eighteen volumes of periodicals and Journals were got bound in the Government Press and added on to the Library.

The following were the Departmental Publications issued during the year :—

1. Entomological series Bulletin No. 9 (The Potato Epilachans Beetle).
2. Mysore Coffee Experiment Station, Bulletin No.7 (Annual Report of the Coffee Scientific Officer 1931-32.)
3. Mysore Coffee Experiment Station Bulletin No. 8 (Report of Work on the Coffee Experiment Station, Balehonnur for the year 1930-31.)
4. Circular No. 48 (Method to be adopted for the cultivation of Sugarcanes in the Irwin Canal Area) Kannada.
5. Circular No. 49 (The Potato Beetle) a serious pest of the Potato crop—Kannada and English.
6. Circular No. 50 (Methods to be adopted for the cultivation of ragi in the Irwin Canal area) Kannada.
7. Circular No. 51 (Method to be adopted for the cultivation of Ground-nut in the Irwin Canal area) Kannada.
8. Circular No. 52 (Agricultural Implements and their description to be used in the Irwin Canal area) Kannada.

LESLIE C. COLEMAN,
Director of Agriculture.

ANNUAL ADMINISTRATION REPORT OF THE AGRICULTURAL CHEMIST FOR THE YEAR 1932-33.

Charge.—Mr. N. Sampath Iyengar, Offg. Agricultural Chemist continued to be in charge of the section from the commencement of the year up to January 28th 1933, when he proceeded on furlough leave for three months and 18 days preparatory to his retirement from service with effect from 17th May 1933.

Mr. K. Bhima Rao officiated as Agricultural Chemist from 28th January 1933 to 1st June 1933 when I took over charge of the section having completed Soil Survey work in the Irwin Canal Tract on which I was engaged since December 1929.

Staff.—Mr. K. Bhima Rao continued to officiate as Headquarters Assistant to the Director of Agriculture from the commencement of the year up to 16th January 1933 with a short break of ten days from 28th September 1932 to 8th October 1932 Mr. D. Hanumanthaiah was Acting Junior Assistant Chemist and Mr. B. Dasappa was Acting Assistant Bacteriologist. Mr. M. Subbiah continued to officiate as Senior Assistant Chemist, during the whole year except for a period of ten days.

Consequent on the retirement from service of Mr. N. Sampath Iyengar, the following changes have been effected since 17th May 1933. Mr. B. Sankara Rao Badami confirmed as Senior Assistant Chemist. Mr. M. Subbiah confirmed as Junior Assistant Chemist. Mr. G. P. Krishna Iyengar confirmed as Analyst. Mr. B. Shankar Rao Badami, Senior Assistant Chemist was permitted to continue to be on special duty in connection with the investigation of insecticidal properties of indigenous plant products, and Mr. D. Hanumanthiah appointed *sub-pro-tem* Junior Assistant Chemist and Mr. B. Dasappa appointed *sub-pro-tem* Assistant Bacteriologist from 17th May 1933.

Mr. B. Dasegowda, Acting Analyst, left the service from 7th February 1933 having been selected by the Mysore Sugar Company, Ltd., for training in Sugar Technology and Mr. K. Lakshminarayana Bhatta was appointed in his place as Acting Analyst.

The services of Mr. S. Ramaswami Sastry, Analyst were placed at the disposal of the Mysore Municipality from 6th April 1933 for work connected with the manufacture of compost and Mr. Bhimasena Rao was appointed as Acting Analyst in his place.

Leave.—Mr. N. Sampath Iyengar was on leave for four months—privilege leave for 12 days from 1st July 1932 and furlough on full average salary for three months and 18 days from 28th January 1933. During the first period, Mr. B. Shankara Rao Badami was in charge of the duties of the Agricultural Chemist in addition to his own duties and during the second, Mr. K. Bhima Rao was Officiating Agricultural Chemist.

Dr. B. T. Narayanan was on privilege leave for one month from 27th October 1932 to 27th November 1932 and again for 35 days from 30th January 1933 to 6th March 1933 and during his absence, Mr. B. Shankara Rao Badami was in charge of the duties of the Bio-Chemist in addition to his own.

Tours.—I was on tour for ten days visiting the Irwin Canal Farm during the month I was in charge of the Section.

Mr. N. Sampath Iyengar was on tour for 59 days visiting Government Farms to supervise manurial experiments and to inspect private estates and to advise on proper methods of manuring.

Mr. K. Bhima Rao was on tour for 44 days in connection with the Dasara Exhibition at Mysore and also to attend to part of the field work of the Section.

Mr. M. Subbiah was on tour for eight days to attend to the field work.

Dr. B. T. Narayanan was on tour for 59 days and Mr. C. S. Ramanuja Iyengar for four days on Sandal Spike Investigation Work.

As in previous years, the following have been the main items of work :—

i. *Pot Culture Experiments.*—(1) to find out the ratio in which N & Pought to be supplied to ragi on a red soil.

(2) to study the effect of soil texture on the availability of N & P manures for ragi and jola.

(3) to determine the water requirements of ragi.

ii. *Experiments in Renco Cisterns.*—to study the manurial requirements of paddy and ground-nut.

iii. *Field Trials.*—on the manuring of Sugar-cane, Paddy, Ragi, Coffee, Areca, Cotton, Jola and Cocoanut on the several Experimental Stations.

iv. *Investigations.*—regarding the use of indigenous plant substances as insecticides.

The results of Pot Experiments of 1932-33 have been interpreted both by the probable error method and by Fisher's Method. Where the original lay out of the plots in field experiments did not admit of interpretation by Fisher's Method, the plan of experiments has been changed so as to make this possible later on.

The following is the summary of results obtained from the crop of 1932-33.

i. *Pot Culture Experiments.*—Ratio of N to P. It is seen from Table I that the ratio 1 : 3 has given a higher yield than the usual 2 : 3 ratio. Judged statistically by Fisher's Method, all the treatments have given significant yields over the check.

ii. *Effect of Soil Texture on the Availability of N & P Manures.*—Results of these experiments are given in Table II, (a to g) and it is seen that according to Fisher's Method of interpretation, red soil has given significant yield over all the mixtures of sand and clay. It is also seen that the mixtures 60 per cent sand plus 40 per cent clay, and 50 per cent sand and 50 per cent clay have given significant yields over the other two mixtures of sand and clay. (Table IIa).

In the case of trials with phosphatic manures (super and bone), the greatest response has been with 80 per cent sand and 20 per cent clay ; and next to it comes 60 per cent sand and 40 per cent clay. Judged statistically, these two mixtures have given significant yields over the other two mixtures with super. Regarding bone, 80 per cent sand and 20 per cent clay has given significant yields over all the remaining mixtures. In addition, 60 per cent sand and 40 per cent clay has given significant yields over 70 per cent sand plus 30 per cent clay and 50 per cent sand plus 50 per cent clay. Seventy per cent sand plus 30 per cent clay also has given significant yield over 50 per cent sand and 50 per cent clay.

The response to oilcakes has however been in the case of 70 per cent sand and 30 per cent clay ; the highest yield having been obtained with a mixture of ground-nut and castor cakes in equal quantities. Used independently, castor cake has given higher yields than ground-nut cake in all the combinations of sand and clay. Yields from compost pots have been, as in the previous year, poor in all the soil combinations. It has not given any significant yield. This may however be due to the fact that conditions in pots are not favourable for a rapid decomposition of a bulky manure like compost. Interpreted statistically, ground-nut cake and castor cake individually have not proved beneficial in any of the sand and clay mixtures but with a combination of the two cakes, the last three mixtures of sand and clay have given significant yields over 80 per cent sand and 20 per cent clay. In addition, 70 per cent sand and 30 per cent clay has given significant yields over 60 per cent sand plus 40 per cent clay, and 50 per cent sand plus 50 per cent clay.

Analysis of plant material from pots under different manurial treatments has been completed for the year 1931-32 ; but that for the current year is in progress. The following are general indications from data obtained so far and given in Tables III to VII :—

i. In experiments for the study of the effect of altering the ratio of N & P in the manuring of red soil for ragi, the highest percentage of recovery of all the three plant-foods has been in the case of the ratio that is being ordinarily recommended, *viz.* 2 N plus 3 P plus 2 K.

ii. In experiments on the influence of soil texture on the availability of P_2O_5 in super-phosphate and bone, the highest percentage of recovery has been in 3 sand plus one clay, the percentage of nitrogen recovered in bone treatment being greater than in the corresponding super treatment in all the combinations of sand and clay.

iii. In experiments on the influence of soil texture on the availability of N in ground-nut cake, castor cake and a mixture of the two, the highest recovery of N from either of the cakes singly has been in the case of 1 sand plus 3 clay, while from the mixture the highest recovery has been in the case of 2 sand plus 2 clay.

iv. Lastly in the series on the influence of soil texture on the availability of compost, the recovery of N has been the least in 3 sand plus 1 clay. Recovery of P_2O_5 and K_2O in none of the soil combinations is half as high as in the cake series.

In the paddy manurial experiments in cisterns the highest recovery of N has been in the case of Ammonium sulphate plus Super and Nicifos 17-45 grade.

Water Requirements of Ragi—Of the 12 pots in which this experiment was tried, 6 did not receive any manure while the other six received a complete manure 1 grm. N, 1½ grams P_2O_5 and 1 gram. K_2O per pot. In each set, 3 pots were given water up to 70 per cent of the water holding capacity of the soil when the crop showed signs of wilting; while the other three were maintained at saturation after the first three weeks. As in previous years, the highest consumption of water per gram of crop produced has been in the unmanured series and the lowest in the pots which received complete manure. Maintaining the soil saturated with water has resulted in a decreased yield in the complete manure series, as seen from figures given in Table VIII.

Experiments in Renco Cisterns.—As all the treatments have not got the same number of replications, the results given in Table IX cannot be interpreted by Fisher's or by Engledow and Yule's Method. Hence, the method of probable error only has been applied. The results in the case of paddy trials confirm those of previous years that Potash is not required for paddy in clay soils. Of the combined manures tried, Nicifos 17-45 grade gave the highest yield, Nicifos 22-18 grade coming next to it. According to the method of probable errors, all the treatments except only N have given significant yields over the check. In addition to it, Nicifos 17-45 grade has given significant yields over only N and Cake plus Super.

In the case of ground-nut from figures given in Table X, it is seen that Nicifos 17-45 grade has again given significant yields over Check and Lime alone. Complete manure has also given the same result, the latter being the better of the two.

Field trials on Experimental Stations.

(i) *Sugar-cane at Hebbal and Babbur.*—At Babbur with H.M. 602 variety of cane the results have been slightly different from those of last year. As seen from Table XI (a) to (d), in the general manurial requirement series while the plots getting N, P and K have given as good yields as those getting N and P only, thereby confirming the view that for the Babbur type of soils potash manures are not quite essential for sugar-cane, the highest yield has been from plots which did not get any N as ammonium sulphate. It is however not safe without further trials to draw the inference that such nitrogenous manures are also unnecessary for these soils. In the two series where different doses of ammonium sulphate and super posphate have been tried, 375 lbs. of ammonium sulphate has given the highest yield in the first and 500 lbs. super in the second. Five hundred lbs. of ammonium sulphate and 750 lbs. of super had given similar results in the previous year. In the series where new manures and mixtures were tried, super at planting has given significant yields over check and Ammophos 20-20. Super and Ammonium Sulphate at planting has given significant yields over Check, Ammophos 20-20 and Nicifos 17-45. Ammophos 13-48 has given significant yields over check. A mixture of super and ammonium sulphate has, as in the previous season, given the highest yield. The inference drawn from the results of 1931-32 that there is no advantage in applying ammonium sulphate in two doses is supported by results of the current year.

At Hebbal, a combination of Sodium Nitrate and Super which gave the highest yield last year has during the current year given an yield slightly less than the Check. As seen from Table XII, the highest yield has been from plots which had received Nicifos II 100 lbs. and Super 160 lbs; a combination of Nicifos I 100 lbs. Super 160 lbs. and Ammonium Sulphate 120 lbs. coming next to it.

Sugar-cane on the Irwin Canal Farm.—Results of manurial experiments on sugar-cane on the Irwin Canal Farm will be found in the report of that Farm. Regular

analysis has however been conducted of the different varieties—some planted outside the regular planting season—that are being tried by the Economic Botanist, with a view to find out varieties that ripen in time to suit an extension of the crushing season and therefore likely to be of use in extending the working of the Factory. The results (Table XIII Appendix) appear quite promising. While some of the varieites such as Local Striped, H.M. 544 and H.M. 544 Striped ripen only from January to March and do not appear to be suited for planting beyond that period, there are others H.M. 602, J. 33a 0-0-1, J. 33a 0-0-4, H.M. 500 and H.M. 320 which ripen in 12 months even when planted in July and August and could as such replace the former with advantage for later plantings. On account of its high sucrose content and free tillering capacity J. 33a 0-0-4 deserves to be tried for this purpose along side of H.M. 320.

Experiments to confirm these indications will be continued during the current and the coming years.

(ii) *Paddy at Nagenahalli, Hebbal and Marthur.*—Results of experiments at the Paddy Breeding Station, Negenahalli are given in Table XIV (a to e). In the general manurial requirements series complete manure (30 lbs. N, 45 lbs. phosphoric acid and 20 lbs. potash) has, as in last year, given the highest yield.

Of the different nitrogenous manures, cyanamide, ammonium sulphate and ground-nut cake have given significant yields over check; and ammonium sulphate has given significant yields over calcium cyanamide, sodium nitrate and ground-nut cake.

While during 1931-32 all the treatments had given significant yields over check, during 1932-33 sodium nitrate has failed to do so. The highest yield last year was from ground-nut cake; this year ammonium sulphate has taken precedence over all others.

Among phosphatic manures, steamed bone meal has, as in previous years, done slightly better than super-phosphate, the yields from both bone and super being significant over check.

Of Nitrogen and phosphoric acid mixed in different ratios 30 lbs. of N and 90 lbs. phosphoric acid has given a very low yield compared to the other two.—30 lbs. N. plus 45 lbs. phosphoric acid and 30 lbs. N plus 60 lbs. phosphoric acid. Even the yields from the last two are not statistically significant. This is quite contrary to the experience of previous years and requires further trial.

Of the different doses of comlpete manure, 2 and 2·5 times the usual dose have given significant yields over the single dose, yields from 2·5 dose are significant over those from check, single dose and 1.5 dose. The highest yield has been, as in 1931-32 from 2·5 dose plot. Whether this response of paddy to very heavy manuring is or is not economic will depend upon the relative prices of paddy and the manures used.

Paddy Manurials at Hebbal.—Paddy yields from the manurial plots on the Hebbal Farm given in Table XV (a to e,) generally confirm the conclusions drawn from those of previous years.

Plots with organic matter both in the presence and in the absence of artificials have given significant yields over those which did not receive organic matter.

In the series getting oilcakes and hongey leaves, all the treatments have given significant yields over check; but unlike last year ground-nut cake and super mixtnre has given the highest instead of the lowest yield.

In the series where oil cakes without hongey leaves were tried against hongey leaves alone, all the treatments except castor cake and bone have given significant yields over only hongey leaves.

Paddy Manurial Experiments on the Marthur Farm.—Results of these experiments are given in Table XVI (a to f). In the first series where ammonium sulphate is compared with a mixture of ammonium sulphate and super the latter has as in 1931-32 given significant yields over the former.

In the 2nd and 3rd series where different doses of a mixture of ammonium sulphate and super and varying doses of super with a fixed quantity of ammonium sulphate were tried, none of the treatments has given significant yields. Results obtained in 1931-32 were just similar to these.

In the fourth series where different doses of a mixture of ground-nut cake and super were tried, 500 lbs. of cake plus 440 lbs. of super has given significant yields over 250 lbs. cake plus 220 lbs. super. In 1931-32 none of the yields were significant.

In the new manures series just as in last year, no yield is significant.

In the last series where cyanamide was tested against Am_2SO_4 cyanamide has given significant yields over check and Am_2SO_4. Last year also, cyanamide had given significant yields over check and over Am_2SO_4.

Ragi.—Experiments on the manurial requirements of Ragi were continued at Hebbal on the same lines as in previous years and results are given in Table XVII. Nitrogen was supplied at the rate of 20 lbs. per acre as Am_2SO_4, $NaNO_3$ or ground-nut cake or as a mixture of the latter with one or the other of the first two; phosphoric acid at 30 lbs. and potash at 20 lbs. per acre were supplied in the form of super-phosphate and muriate of potash. The year's results generally confirm those of last year.

Complete manure has given significant yields over check and also over mixtures containing N plus P, N plus K and P plus K. $NaNO_3$ both alone and along with ground-nut cake has given higher yields than sulphate of ammonia.

Coffee.—All the experiments conducted during the previous year have been continued on the same lines during the year under report.

One outstanding feature of the current year's yields given in Tables XVIII to XX is that it is higher than that of last year which was itself a bumper one.

From the data collected so far it is also seen that previous to the commencement of manuring, bumper and lean years were alternating, where as since 1927-28, the year in which the manures commenced to have their full effect on the plants, there has been a three years' cycle—a lean year followed by two bumper ones, the yields during the third year being the heaviest.

In the general manurial series, complete manure has given the highest yield—638 lbs. more of ripe cherry than the check, the plots that received only Nitrogen coming next with 580 lbs. more, giving an increase of 24 per cent and 22 per cent respectively. Nitrogen and phosphoric acid and nitrogen and potash come next with an increase of 7·8 and 4·9 per cent over the check.

In the nitrogenous manures series, Nicephos has given the highest yield—721 lbs. more than the check, an increase of 23 per cent. $NaNO_3$ and Am_2SO_4 come next with an increase of 17 per cent and 14 per cent, respectively. The last named has given higher yields than check in all the years that it has been tried and higher yields than ground-nut cake also in most of the years. Since Nicifos and $NaNO_3$ have been tried only since 1929-30, it is too early to draw any conclusions.

In the phosphate series Super comes highest with 768 lbs. or nearly 25 per cent more than the check; Basic Slag comes next with 431 lbs. or 14 per cent more than the check.

In the potash series KCl has given 269 lbs. more than the check, an increase of nearly 8 per cent.

As explained in the Coffee Experimental Station Report, there seems to have been a large amount of marginal effect, hence this year's manuring has been done after re-arranging the blocks taking 12 rows per plot instead of 4 rows, the two extreme 4 rows serving as rings to the central 4 rows.

In the new block where different mixtures are being tried since 1929, Am_2SO_4 plus Super plus K_2O has given 428 lbs. or 17 per cent more than the check. Ground-nut cake plus Am_2SO_4 plus Super and K_2O has given an increase of about 8 per cent. The same result had been obtained in the previous years as well.

In experiments on the variation of plant food ratio, the ratio 4 N : 3P : 4K has given the highest yield, 398 lbs. more than the check, an increase of 19 per cent.

Of the varying doses of mixtures, single dose has given 14 per cent (222 lbs.) more than the check. The one-and-a-half and two doses seem to have had a depressing effect.

Studies on the effect of soil re-actions on the growth of coffee have not yet advanced sufficiently far to admit of any conclusions being drawn.

Coffee Pulping Experiments.—These experiments were carried on on the same lines as in 1931-32 with samples from the manurial and other plots. Five lbs. lots of

ripe cherry from each treatment were weighed out separately and pulped and dried, and weights of floats, of hard beans in floats and those of wet and dry parchment all recorded (statement of figures in Table XXI in Appendix). It will be observed that the percentage of floats in samples from the second picking (1.76 to 3.17) is considerably lower than that (2·11 to 11·76) of the first picking, and of the several experimental plots those under 'general manurial series' have given a comparatively higher percentage of floats than the rest. The percentage of hard beans in floats is higher in the first than in the second picking. There is however no such marked difference between the weights of wet and dry parchments from samples from different treatments and from those of the first and the second picking.

It is however not safe, from the data available, to draw any conclusions. The determinations will be continued for a few more seasons.

Areca.—The present set of experiments was started in the year 1926-27 and is being continued since then. The details of the experiment with the average yields is given in Table XXII.

Such of the palms as are not being manured now have received manures during 1924-26 and hence have derived the residual effects, while those that receive manure now were untreated during 1924-26. From the table we can study 1. residual effect *from the untreated plots*, and 2. manurial effects from the treated plots.

As regards residual effects, it is seen from the appended table that there has been a steady fall in the yields since 1927. The yields during 1932 are much less than those of 1927, and as compared to those of 1926, there is a considerable fall. The yields have come down to nearly 600 lbs. per acre (which is the average yield for the locality). It is also seen in general that plots receiving N plus P plus K have better residual effects than those getting only N plus K. Comparing the cake series with Am_2SO_4 series, cake series seems to be better.

Coming now to the manured plots, as stated above, these plots have received no manures during 1924-26 but were treated during 1921-23.

Yields in 1927, which have come down to the average yield of the locality (600 lbs. per acre) have been continuously rising year by year. There is a small drop in 1931 which can be explained by the fact that the garden was not manured in 1930, but the yields have gone up in 1932. It is also seen that all the manured plots have yielded more than 600 lbs. per acre, the smallest increase being 162 lbs. (nearly 6 maunds).

Amongst the various treatments, it is seen that the mixture of 50 lbs. nitrogen (cake), 75 lbs. P_2O_5 (Super) and 100 lbs. K_2O (K_2SO_4) has given higher yields than the remaining treatments all through the six years, the increase in yield over the local yield of 600 lbs. per acre varying from 82 lbs. (3 maunds) to 273 lbs. (10 maunds), giving an average increase of 186 lbs. (7 maunds nearly).

Next in order comes the mixture of 100 lbs. N (cake), 150 lbs. P_2O_5 (super) and 200 lbs. K_2O(K_2SO_4) giving an increase of 144 lbs. There is not much appreciable difference amongst the yields of cake, Am_2SO_4 and Nitrolim treatments respectively. Four hundred lbs. P_2O_5 has given the lowest yields in most of the years.

Another feature that can be observed from the table is the fluctuation in yields in the various years. During 1921-23, it is seen from the check plot yields that there is an alternate fall and rise, but since the commencement of manuring, there has been a continuous rise in the manured plot yields. During 1924-26 also, it is seen that there is a rise in the manured plot yields year after year, while the unmanured plots yields have a fall and a rise. During the period 1927-32, untreated plots yields have fallen steadily till 1930 with a rise in 1931 and a slight fall in 1932. But the manured plots yields have steadily increased all through, even the lean year yield in 1931 being much better than the local yield.

The available figures seem to confirm the idea that a garden once brought to a good condition may be manured once in three years. This statement is borne out by the fact that the untreated plot yields have come down to nearly 600 lbs. in 1929 (after not being manured for three years) and have continued to fall. In the treated plots also, it is seen that the yields which were near about 600 lbs. in 1927 are above the average in 1931, though the garden received no manures during 1930. These plots have been receiving manures again since 1931 and hence, it is not possible to say what the residual effects would have exactly been.

Cotton and Jola.—On the Babbur Farm, plots for the study of the manurial requirements of cotton and Jola have been relaid on the Latin Square Plan. The results given in Tables XXIII and XXIV are however vitiated on account of an excessive wash and mixing up of the soil from the several plots due to unusually heavy rains. No statistical interpretation is therefore attempted. The results of cotton manurials in cylinders are given in Table XXIII c. The highest yield has been from the cylinders which received P plus K, N plus P coming next to it.

Cocoanut.—Experiments were conducted on lines similar to those of last year at the Babbur Farm. A statement of yields for the entire period 1931-33 is given in Table XXV.

The figures have been grouped under four heads, each group giving the number of nuts harvested during a period of six months. It will be observed that 2 N plus P plus K has given higher yields 200 nuts more per acre on an average—than check all through the four seasons and next in order comes 'only N' giving 120 nuts more per acre.

As however it is found that there is much variation in the yields, both in the case of individual treatments and also in individual palms, it is proposed to study the behaviour of individual palms with a view to select them for future work.

Pasture Manuring.—Field trials on the manuring of grass land that have been in progress for two years on the Cattle Breeding Station have been continued. No statistical interpretation of results is attempted as it has been observed that there is an uneven distribution of different varieties of grass in the several plots. Attempts are being made to eliminate this source of error before the next season. The yields obtained during the year (Table XXVI) however confirm the general indications of previous years that the soil is in need of manuring and that response to artificials is satisfactory.

Investigation regarding the Use of Indigenous Plant Substances as Insecticides.—This investigation was undertaken to provide cheap but efficient insecticides from indigenous plant products such as the fish poisons, etc., that are available in large quantities in our Forests. With a view to fix the exact conditions under which the comparison of the toxicity of different materials had to be made, the materials to be tested were made to pass through a 100 mesh sieve.

The next point to be decided was the selection of a solvent as it had to be both cheap and possess a fair capacity for efficient extraction of the insecticide from the crude plant material; Acetone and methyl and ethyl alcohols were made use of chiefly for extraction purposes though chloroform and carbon tetrachloride were also used occasionally.

Powdered samples passing through a 100 mesh sieve and acetone extracts of the following material were prepared and the insecticidal activity of the powder before and after extraction as also the activity of the extract itself were tested by the Entomological Section and may be reported upon by them.

1. Outer fleshy portion of Randia Demetorum fruit, 2. The seed nut inside the randia fruit, 3. Complete randia fruit, 4. Hongey root bark, 5. Hongey stem bark. 6. Root bark of mundulia suberosa, 7. Stem bark of mundulia suberosa, 8. Balgani leaf powder, 9. Dodda Karay, 10. Mug Karay, 11. Buthi Karay, 12. Neera Sanna Soppu,and 13. Custard apple seed.

Methyl alcohol extracts of 1. Randia fruit, 2. the root bark of mundulia *suberosa*, 3. Hongey root bark were also prepared and their insecticidal activity tested as methyl alcohol was available cheap and in large quantities at the Bhadravati Iron Works. Of these, only Hongey root bark was found effective, but the stoppage of wood distillation at Bhadravati has cut short this large local solvent supply. Ethyl alcohol extracts of the following substances have been prepared and their insecticidal activity tested and the extracts were found to be active. 1. Root bark of Mundulia Suberosa, 2. Marking nut powder, 3. Kamala powder, and 4. Custard apple seed.

Further work was confined chiefly to the following plant products which are available in large quantities, *viz.* 1. Sagada seed, 2. Randia fruit, 3. different parts of hongey tree, 4. different parts of the shrub *mundulia suberosa*, and 5. seeds of custard apple. From investigations carried out so far, the importance of the following three phases of insecticidal investigation have been strongly impressed.

1. The necessity for breeding one or two species of insects that are available throughout the year and are fairly resistant to toxic substances. This is necessary because of the fact that a particular species of insect on which a crude powder has been tested will not be available when the extract of that powder is ready for testing or when the extract itself sometimes later is chemically separated into various parts and the activity of each part has to be tested to find out in which part the activity is concentrated.

2. To have a small plantation near at hand of the plants to be tested. This again is necessary because it has been found that different samples of the same substance for example, root bark of mundulia suberosa obtained at different times have shown different degrees of toxicity, at times almost nil; and this may be due to difference in growth or seasonal condition the study of which will be greatly facilitated by growing a plantation and taking samples at various times.

3. Since the extracts are found to deteriorate rapidly in solution and lose their insecticidal property, it becomes necessary to investigate in each case the particular conditions that would prevent this deterioration. Particular attention will hereafter be devoted to each of these phases.

A new method, the carbon tetrachloride method, for the assay of Rotenone in crude plant products has recently been published in Ind. Eng. Chem. Anal. Ed. 5, 23 (1933) by H. A. Jones, and this method will now be applied to substances that have been investigated hitherto.

In the case of bark powders of *mundulia suberosa* the water extract itself is found to possess a fair amount of insecticidal activity, but this could only be due to substances other than 'Rotenone' which is almost insoluble in water. The nature of the water soluble substance is now being investigated.

Hongey Oil Resin Soap.—While searching for the active principle in different parts of Hongey tree the presence of it was noticed in Hongey oil also. To facilitate practical application to plants in the field, Hongey oil soap was made and it was also found to be active. From analogy of different kinds of fish oil resin soap from Soda and Potash, Hongey oil resin soaps both neutral and slightly alkaline were made and their activity compared with the imported fish oil resin soap. Of these soaps, the neutral Hongey oil resin soda soap in which the proportion of oil to resin was 1 : 1 was found to be as active as and sometimes slightly better than the imported fish oil resin soap when sprayed against green bugs in the same strength. The cost of one pound of Hongey oil resin soap was found to be slightly less than the cost of one pound of fish oil resin soap. When prepared on a large scale the cost of Hongey oil resin soda soap may be further reduced by another 20 to 25 per cent. The co-operation of the Government Soap Factory was then sought and 100 lbs. of neutral Hongey oil resin soda soap were obtained and tried on a field scale against green bugs and cabbage aphis with very encouraging results. It was also observed that cabbage plants sprayed with Hongey oil resin soda soap had less further infestation by aphis than those sprayed with fish oil soap, thereby indicating a deterrent action on cabbage aphis. This point needs further observation.

Further isolation of the active principle in Hongey oil is receiving attention.

Dasara Exhibition.—As in previous years, exhibits (maps, graphs, photographs and samples) pertaining to principal items of work of the Section were exhibited along with those of other sections of the Department at the Annual Dasara Exhibition 1932. Although the exhibits are by their very nature not such as to appeal to casual visitors it was gratifying to note that quite a large number of practical agriculturists evinced considerable interest in the exhibits of this Section particularly those that related to the results of large scale manurial experiments on private estates.

General.—Investigations pertaining to the manurial requirements of the principal crops of the State have been progressing satisfactorily and advice that is being given to raiyats based on the results so far available is, I am glad to note, being appreciated by the parties. Requisitions for inspection of estates, for analysis of soils and manures and for advice on manuring from private agriculturists large and small are on the increase and are being complied with as far as possible without prejudice to other work.

The following is a statement indicating the number of samples handled both in the field and in the laboratory in connection with investigations embodied in the report :—

STATEMENT OF THE NUMBER OF SAMPLES ANALYSED.

	Nature of the samples.	Number analysed	Number of determinations.
1.	Fertility studies in soils	265	751
2.	Crops from Pot-culture experiments	158	760
3.	Fertilisers and manures	197	404
4.	Sugar-cane juice samples..	398	2,133
5.	Extraction tests of sugarcane	6	6
6.	Estimation of copper in sprayed sets of coffee leaves..	300	600
7.	Miscellaneous	23	174
	Total number of samples treated	1,347	..
	Total number of determinations	..	4,828

Before concluding, I wish to express my appreciation of the efficient manner in which Mr. Sampath Iyengar carried on the work of the Section during my absence and the whole hearted co-operation of the rest of the staff.

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POT CULTURES.

RAGI MANURIAL EXPERIMENTS:—1932-33.

I. Ratio of Nitrogen to Phosphoric acid for red soils.

Treatment	Check	1 N plus 2 P plus 2 K	1 N plus 3 P plus 2 K	1 N plus 4 P plus 2 K	2 N plus 3 P plus 2 K	2 N plus 2 K
Mean yield of grain (in grams) per pot	9.0	29.5	32.3	30.5	29.4	29.3
Probable error of means	±0.61	±1.41	±0.84	±1.57	±1.02	±1.44

Standard error of difference of means = 2·40

II. Effect of soil texture on the availability of N and P manures.

(*a*) Check.

Soil	Red soil	80 P.C. sand plus 20 P.C. clay	70 P.C. sand plus 30 P.C. C lay	60 P.C. sand plus 40 P.C. Clay	50 P.C. sand plus 50 P.C. Clay
Mean yield of grain (in grams) per pot.	9.0	3.0	2.9	6.1	5.7
Probable error of means ..	±0.61	±0.42	±0.09	±0.40	±0.26

Standard error of difference of means = 0·77

(*b*) Superphosphate.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40% clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	47.2	27.4	45.0	29.1
Probable error of means	±0.81	±0.4	±1.15	±2.35

Standard error of difference of means = 2·9.

(*c*) Bone.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40%clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	51.9	41.1	45.5	32.7
Probable error of means	±1.22	±0.76	±1.20	±1.05

Standard error of difference of means = 1·04

(*d*) Compost.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40% clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	11.5	14.6	19.5	17.6
Probable error of means	±0.85	±0.89	±0.69	±0.63

Standard error of difference of means = 1·75

(*e*) Groundnut cake.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40% clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	40.8	44.5	33.1	44.2
Probable error of means	±0.86	±0.66	±1.47	±2.24

Standard error of difference of means = 3·39

(*f*) Castor cake.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40% clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	40.1	46.5	39.7	48.4
Probable error of means	±1.84	±1.75	±2.46	±1.42

Standard error of difference of means = 4.38

(*g*) Groundnut cake and castor cake.

Mixture of sand and clay	80% sand plus 20% clay	70% sand plus 30% clay	60% sand plus 40% clay	50% sand plus 50% clay
Mean yield of grain (in grams) per pot ..	38.7	50.4	45.5	44.6
Probable error of means	±0.42	±0.84	±1.73	±0.57

Standard error of difference of means = 1.61

III. Recovery of plant foods in Ragi during 1931-32. Ratio of N. to P. for Red. Soils.

No.	Treatment	Percentage of plant food recovered in the crop		
		N.	P2 O5	K2 O
1	1 N plus 2 P plus 2 K	64.96	25.93	60.52
2	1 N plus 3 P plus 2 K	65.03	18.27	51.12
3	1 N plus 4 P plus 2 K	62.52	14.41	49.41
4	2 N plus 3 P plus 2 K	67.64	25.19	100.0
5	2 N plus 2 K	60.08	....	84.30

IV. Influence of soil texture on the availability of P2 O5 in superphosphate and bone.

No.	Soil texture	Percentage of Pt. food recovered in the crops					
		Superphosphate			Bone		
		N.	P2 O5	K2 O	N.	P2 O5	K2 O
1	3 Sand & 1 Clay ..	56.17	32.68	100	67.63	22.08	100
2	2 Sand & 2 Clay ..	67.06	29.38	100	71.15	19.21	100
3	1 Sand & 3 Clay ..	58.86	21.13	100	74.02	14.33	100
4	All Clay	64.29	22.17	100	81.63	16.76	100

V. Influence of soil texture on the availability of N in groundnut cake and castor cake.

No.	Soil texture	Percentage of Pt. food recovered in the crops								
		G. N. cake			Castor cake			Mixture of G. N. and castor cakes		
		N.	P2 O5	K2 O	N.	P2 O5	K2 O	N.	P2 O5	K2 O
1	3 Sand plus 2 Clay ..	39.41	26.47	100	41.79	28.68	100	41.14	30.44	100
2	2 Sand plus 2 Clay ..	45.73	29.85	100	58.79	29.55	100	55.79	32.45	100
3	1 Sand plus 3 Clay ..	49.43	26.50	100	59.39	27.05	100	51.01	26.80	100
4	All Clay	34.60	17.60	100	42.02	18.69	80.87	43.22	23.14	100

VI. Influence of soil texture on the availability of N in Compost.

No.	Soil texture	Percentage of plant food recovered in the crops		
		N.	P2 O5	K2 O
1	3 sand & 1 clay	9.04	11.07	77.84
2	2 sand & 2 clay	16.13	13.90	80.84
3	1 sand & 3 clay	15.86	13.89	82.39
4	All Clay	12.87	12.35	49.59

VII. Paddy manurial experiments in cisterns. Recovery of plant foods under different treatments.

No.	Treatment	Percentage of plant food recovered in the crop		
		N.	P2 O5	K2 O
1	N & P	83.52	32.77	..
2	N & P & K	71.94	28.21	100
3	N.	48.17	..	..
4	Groundnut cake & Super	16.90	4.11	..
5	Nicifos 22-18	60.84	23.13	..
6	*Ammophos* 20-20	30.18	8.5	..
7	Nicifos 17-45	83.56	13.32	..

VIII. Quantity of water consumed for 1 gram of crop (Ragi) produced.

No.	Manurial treatment	Supply of water	Average total crop in grams per pot	Average consumption of water in grams per gram of crop produced
1	No manure ..	70% and wilting point	20.9	588.7
2	No manure ..	Maintained at saturation	22.4	608.0
3	N plus P plus K ..	70% and wilting point	117.6	194.7
4	N plus P plus K ..	Maintained at saturation	113.0	218.1

IX. Paddy Manurial experiments in Renco cisterns. Yields under different treatments.

Treatment	Check	N and P	N and P and K	N.	G. N.cake and super	Nicifos 22–18	Ammo-phos 20–20	Nicifos 17–45
Mean yield of grain in grams	230.0	419	408	309	378	422	396	460
Probable error of means ..	±24.5	±17.7	±32.5	±40.5	±12.2	±51.4	±20.5	±22.1

X. Groundnut manurial experiments (Renco cisterns.)

Treatment	Check	Nicifos 17-45 and K	N plus P and K	*Ammophos* 13-48 and K	P and K	Lime N plus P plus K	Lime alone
Mean yield of pods (in grams) per cistern.	199	267	280	247	218	240	213
Probable error of means	±9.9	±10.1	±16.5	±19.5	±15.2	±15.1	±6.6

XI. Sugarcane manurial experiments.—Babbur Farm.

(*a*) General manurial requirements.

Treatment	Check	N and P and K	P and K	N and K	N and P
Average yield (in tons) per acre.	24.3	26.3	28.3	20.3	26.8

Standard deviation of differences between comparable plots .. .. .. = 4.28
Standard error of mean difference .. .. = 2.14

(*b*) Different doses of Ammonium sulphate.

Treatment	Check	125 lbs.	250 lbs.	375 lbs.	500 lbs.
Average yield (in tons) per acre	22.1	24.0	26.1	26.4	24.9

Standard deviation of differences between comparable plots 3.92
Standard error of mean difference 1.26

(*c*) Varying doses of Super.

Treatment	Check	250 lbs.	375 lbs.	500 lbs.	750 lbs.
Average yield (in tons) per acre.	22.8	26.5	28.5	29.3	25.2

Standard deviation of differences between comparable plots 4.46
Standard error of mean difference 2.23

(*d*) New manures and mixtures.

Treatment	Check	Super at planting	Super and Am2 SO4 at planting	Ammophos 13-48	Ammophos 20-20	Nicifos 22-18	Nicifos 17-45
Average yield (in tons) per acre.	22.4	29.6	31.2	29.2	23.9	26.8	25.1

Standard deviation of differences between comparable plots 4.82
Standard error of mean difference 2.78

XII. Sugarcane manurial experiments.—Hebbal Farm.

Treatment	Check	Ammophos 20-20 at 100 lbs. super 200 lbs. and 160 lbs. Am2 SO4 10 weeks later per acre	Nicifos II at 100 lbs. super 200 lbs. and 160 lbs. Am2 SO4 10 weeks later per acre	Nicifos I at 100 lbs. and Am2 SO4 160 lbs. 10 weeks later per acre	Ammophos 13-48, 100 lbs. and Am2 SO4 160 lbs. 10 weeks later per acre	Am2 SO4 in 2 doses 80 lbs. and 120 lbs. super at 300 lbs. per acre	Na NO3 at 320 lbs. and and super at 300 lbs.	Am2 SO4 240 lbs. and super 300 lbs.
Average yield in (cwts.) per plot of 4 rows.	26.3	25.9	29.1	27.9	25.6	25.7	25.5	24.2
Average yield (in tons) per acre.	40.0	40.4	45.4	44.3	40.0	42.9	40.42	39.2

Standard deviation of differences between comparable plots 2.64
Standard error of mean difference 1.52

TABLE XIII.

Table showing the yield and the analysis of the juice of several varieties of sugarcane grown on the Irwin Canal Farm.

Serial No.	Yield per acre (in tons)	Brix at 17.5 C.	Glucose per cent	Sucrose per cent	Variety
1	59.52	16.43	1.40	14.00	H. M. 544.
2	59.93	16.83	1.25	14.60	H. M. 544 striped.
3	55.92	17.83	1.40	15.40	Local striped.
4	54.08	19.51	0.71	17.70	H. M. 320.
5	42.11	19.44	0.67	17.40	H. M. 500.
6	58.33	19.05	0.66	17.00	J. 33 a 0-0-1.
7	56.34	19.38	0.60	17.40	H. M. 602.
8	48.08	20.84	0.40	19.00	J. 33 a 0-0-4.

TABLE XIV.

PADDY MANURIAL EXPERIMENTS.

NAGENAHALLI PADDY BREEDING STATION.

(a) General manurial requirements.

Treatment	Check	N.	N and P	N and K	N and P and K
Mean yield (in lbs.) of grain per acre.	2,429	2,698	2,706	2,702	2,993

Standard deviation of differences between comparable plots 320.8
Standard error of mean difference 191.2

(b) Nitrogen in different forms.

Treatment	Check	Cyanamide	Nitrate of Soda	Sulphate of Ammonia	G.N. cake
Mean yield (in lbs.) per acre	2,227	2,695	2,471	3,061	2,530

Standard deviation of differences between comparable plots 222
Standard error of mean difference 128.3

(c) P2O5 in different forms.

Treatment	Check	Super	Steamed bone
Mean yield (in lbs.) per acre	1,797	2,579	2,537

Standard deviation of differences between comparable plots 115.3
Standard error of mean difference 66.6

(d) N. & P. in different ratios.

Treatment	Check	30 lbs. N and 45 lbs. P	30 lbs. N and 60 lbs. P	30 lbs. N and 90 lbs. P
Mean yield (in lbs.) per acre	2,609	2,860	3,001	2,846

Standard deviation of differences between comparable plots 726.2
Standard error of mean difference 42.0

(*e*) Complete manure in different doses.

Treatment	Check	Single dose	1.5 dose	Double dose	2.5 doses
Mean yield (in lbs.) per acre	2,234	2,191	2,151	2,277	2,591

Standard deviation of differences between comparable plots 285.6
Standard error of mean difference 165.1

TABLE XV.

HEBBAL FARM.

PADDY MANURIAL EXPERIMENTS.

(*a*) Organic matter against no organic matter.

Treatment	Organic matter	No organic matter
Mean yield (in lbs.) of grain per plot	85.8	79.2
Mean yield (in lbs.) of grain per acre	1,716	1,584

Standard deviation of differences between comparable plots 4.22
Standard error of mean difference 1.8

(*b*) Minerals with organic matter.

Treatment	Check	150 lbs. Am2 SO4 per acre		
		Plus 250 lbs. super per acre	Plus 375 lbs. super per acre	Plus 500 lbs. super per acre
Mean yield (in lbs.) of grain per plot.. ..	85.8	102.5	106.3	94.5
Mean yield (in lbs.) of grain per acre.. ..	1,716	2,050	2,125	1,890

Standard deviation of differences between comparable plots 6.75
Standard error of mean difference 3.57

(*c*) Minerals without organic matter.

Treatment	Check	150 lbs. Am2 SO4 per acre		
		Plus 250 lbs. *super*	Plus 375 lbs. *super*	Plus 500 lbs. *super*
Mean yield (in lbs.) of grain per plot.. ..	78.9	90.5	91.3	106.3
Mean yield (in lbs.) of grain per acre.. ..	1,584	1,805	1,825	2,125

Standard deviation of differences between comparable plots 5.41
Standard error of mean difference 2.70

(*d*) Oil cakes with Honges leaves.

Treatment	Check	G. N. cake and super	G. N. cake and bone	Honge cake and super	Castor cake and super	Castor cake and bone
Mean yield (in lbs.) of grain per plot..	73.7	106.5	91.5	94.5	90.0	91.0
Mean yield (in lbs.) of grain per acre..	1,480	2,130	1,830	1,890	1,800	1,820

Standard deviation of differences between comparable plots 7.59
Standard error of mean difference 5.36

(e) Oilcake without Hongey leaves.

Treatment	Hongey leaf	G. N. cake and super	G. N. cake and bone	Hongey cake and super	Castor cake and super	Castor cake and bone
Mean yield (in lbs.) of grain per plot.	80.0	88.0	84.5	85.5	81.5	87.5
Mean yield (in lbs.) of grain per acre..	1,573	1,760	1,690	1,710	1,630	1,750

Standard deviation of differences between comparable plots 1.34
Standard error of mean difference 0.94

TABLE XVI.

MARTHUR FARM.

PADDY MANURIAL EXPERIMENTS.

(a) Sulphate of ammonia against (Sulphate of ammonia and Super).

Treatment	Check	Sulphate of Ammonia 3·75 lbs.	Sulphate of Ammonia 3.75 lbs. super 8.25 lbs.
Mean yield of grain (in lbs.) per plot..	39.7	34.7	44.3
Mean yield of grain (in lbs.) per acre..	....	....	....

Standard deviation of differences between comparable plots 7.33
Standard error of mean difference 4.24

(b) Different doses of Am2 SO4 and Super.

Treatment	Sulphate of Ammonia 2.5 lbs.super 5.5 lbs.	Sulphate of Ammonia 3.75 lbs. super 8.25 lbs.	Sulphate of Ammonia 5 lbs. super 11 lbs.
Mean yield of grain (in lbs.) per plot	37.7	39.3	42.0
Mean yield of grain (in lbs.) per acre	....	....	....

Standard deviation of differences between comparable plots 6.33
Standard error of mean difference 3.6

(c) Varying doses of Super.

Treatment	3.75 lbs. of Sulphate of Ammonia		12.5 lbs. super
	6.75 lbs. super	8.25 lbs. super	
Mean yield of grain (in lbs.) per plot	40.7	41.7	42.0
Mean yield of grain (in lbs.) per acre	....	....	....

Standard deviation of differences between comparable plots 4.78
Standard error of mean difference 2.76

(d) Groundnut-oil-cake series.

Treatment	Cake 6.25 lbs. super 5.5 lbs.	Cake 10 lbs. super 8.25 lbs.	Cake 12.5 lbs. super 11 lbs.
Mean yield of grain (in lbs.) per plot..	40.3	42.7	46.0
Mean yield of grain (in lbs.) per acre..	....	....	....

Standard deviation of differences between comparable plots 3.31
Standard error of mean difference 1.9

(e) New manures series.

Treatment	Check	Sulphate of ammonia plus super	Nicifos 17-45	Ammophos 13-48	Nitrate of soda and super
Mean yield of grain (in lbs.) per plot.	76.7	84.0	81.0	86.0	75.3
Mean yield of grain (in lbs.) per acre.	....	....	....	....	....

Standard deviation of differences between comparable plots 10.99
Standard error of mean difference 6.3

(f) Cyanamide series.

Treatment	Check	Sulphate of ammonia at 10 lbs. and super 22.5 lbs	Cyanamide 10.5 lbs. and super 22.5 lbs.
Mean yield of grain (in lbs.) per plot	84.3	90.7	104.0
Mean yield of grain (in lbs.) per acre	....	....	....

Standard deviation of differences between comparable plots 10.2
Standard error of mean difference 5.9

TABLE XVII.

HEBBAL FARM.

RAGI MANURIAL EXPERIMENTS.

Treatment	Check	Am Sulphate, super, Pot. Muriate	Super, Pot. Muriate	Am. Sulphate, Pot. Muriate	Am. Sulphate, super	Nitrate of Soda, super, Pot. Muriate	G. N. cake, super, Pot. Muriate	Nitrate of Soda, G. N. cake, super, Pot. Muriae	Am Sulphate plus G.N. cake, super, Pot. Muriate
Yield(in lbs.)per plot.	59.7	80.6	57.6	69.0	68.0	91.6	68.6	87.3	71.6
Yield(in lbs.)per acre.	1,150	1,612	1,152	1,380	1,360	1,832	1,372	1,746	1,432

Standard deviation of differences between comparable plots 12.2
Standard error of mean difference 7.0

TABLE XVIII.

STATEMENT OF YIELDS OF THE COFFEE FARM FOR THE YEAR 1932-33.

17 acres block.

Treatment.	Average yield of ripe berries (in lbs.) per acre (1,280 bushes bearing and non-bearing.)
A. GENERAL MANURIAL SERIES.	
Check	2,606
N	3,186
P	2,666
K	2,269
N plus P	2,734
N plus K	2,810
P plus K	2,278
N plus P plus K	3,244
B. NITROGENOUS MANURES SERIES.	
Check	3,070
Oilcake	2,847
Ammonium sulphate	3,491
Nicifos	3,791
Sodium Nitrate	3,612

Treatment.	Average yield (in lbs.) of ripe berries per acre 1,280 bushes bearing and non-bearing.
C. Phosphatic manures series.	
Check	3,077
Super	3,845
Basic slag	3,508
Steamed bone	3,200
Raw bone	3,128
D. Potash series.	
Check	3,321
Pot. Sulphate	3,318
Pot. Chloride	3,590

Table XIX.

8.—Acre block.

Treatment	Average yield (in lbs.) of ripe berries per acre (1,280) bushes bearing and non-bearing.
A.—Series. Mixtures and Reinforcements of manure.	
Check	2,604
300 lbs. of G. N. Cake	..
200 „ of Super	..
100 „ of K_2SO_4 and KCl	2,590
125 lbs. Am-sulphate	
200 „ Super and 100 lbs. Potash	3,032
135 lbs. Calcium Cyanamide 200 lbs. Super plus 100 lbs. Potash ..	2,602.5
150 lbs. Sodium Nitrate plus 200 lbs. Super plus 100 lbs. Potash ..	2,728.0
63 lbs. Am-Sulphate 75 lbs. Sodium Nitrate, 200 lbs. Super and 100 lbs. Potash	2,789.0
150 lbs. G.N. Cake plus 63 lbs. Am-Sulphate 200 lbs. Super and 100 lbs. Potash	2,822.5
150 lbs. G. N. Cake plus 75 lbs. Sodium Nitrate and 200 lbs. Super plus 100 lbs. Potash	2,667.0
100 lbs. G. N. Cake 42 lbs. Am-Sulphate 50 lbs. Sodium Nitrate, 200 lbs. Super and 100 lbs. Potash.	2,807.5
150 lbs. G. N. Cake 300 lbs. Castor Cake 100 lbs. Super 84 lbs. Bone-meal 100 lbs. Potash	2,741.0
B.—Series. Variation of plant food ratio.	
Check	2,037.5
300 lbs. G. N. Cake, 200 lbs. Super, 100 lbs. Potash	2,143.0
600 lbs. G. N. Cake, 200 lbs. Super, 100 lbs. Potash	2,435.0
300 lbs. G. N. Cake, 270 lbs. Super, 100 lbs. Potash	1,947
300 lbs. G. N. Cake, 200 lbs. Super, 150 lbs. Potash	1,699
C.—Series. Time of application of manures.	
Check	1,746
Full dose after the monsoon	1,903
Full dose before the monsoon	1,895
Half the dose before and half the dose after the monsoon	1,963
D.—Series. Varying doses of Complete manure.	
Check	1,583
Single dose	1,809
One and a half dose	1,629
Double dose	1,374

Table XX.

Half acre blocks.

A. Gantenayak Road Block.	
Check	1,897
400 lbs. G. N. Cake plus 250 lbs. Super plus 120 lbs. Potash.. ..	2,303
600 lbs. G. N. Cake plus 375 lbs. Super plus 180 lbs. Potash.. ..	2,428
800 lbs. G. N. Cake plus 500 lbs. Super plus 360 lbs. Potash.. ..	2,352

Treatment.	Average yield (in lbs.) of ripe berries per acre (1,200 bushes bearing and non-bearing.)
B. Gate Block (L_2).	
Check	2,022
250 lbs. G. N. cake plus 60 lbs. Sodium Nitrate plus 250 lbs. Super plus 120 lbs. Potash	2,332
75 lbs. Ammonium Sulphate plus 100 lbs. Sodium Nitrate plus 250 lbs. Super plus 120 Potash	2,353
80 lbs. Ammonium Sulphate plus 100 lbs. Nicifos I plus 120 lbs. Potash	2,010
60 lbs. Ammonium Sulphate 100 lbs. Nicifos II plus Super 150 lbs. and 120 lbs. Potash	1,933
C. Cooly Line Block.	
Check	3,576
250 lbs. G. N. cake plus 250 lbs. castor cake plus 250 lbs. Super and 120 lbs. Potash	3,812
250 lbs. G. N. cake 250 lbs. Castor cake 135 lbs. Super plus 100 lbs. Bonemeal plus 120 lbs. Potash	3,329
150 lbs. Ammonium Sulphate plus 250 lbs. Super plus 120 lbs. Potash	3,550
250 lbs. G. N. Cake plus 50 lbs. Ammonium Sulphate plus 250 lbs. Super, 120 lbs. Potash	3,734

Table XXI.

Coffee Pulping Experiments. 1932-33.

Serial No.	Treatment	Floats per cent	Hard beans in floats per cent	Wet parchment per cent	Moisture-free parchment per cent	Remrks
	I. General manurial series.					
	Unlimed.—					
1	Check	9.65	41.10	39.84	18.69	
2	N	9.56	38.71	42.35	19.69	
3	P	11.76	41.20	42.36	19.57	
4	K	9.25	42.86	42.35	19.54	
5	N plus P	10.66	39.68	42.81	19.63	
6	N plus K	8.68	32.07	43.12	19.88	
7	P plus K	10.66	40.50	42.36	19.56	
8	N plus P plus K	9.91	39.99	42.81	19.79	
	Limed.—					Samples taken from the first picking.
9	Check	6.96	45.56	44.22	20.89	
10	N	10.00	47.14	43.90	20.63	
11	P	10.88	44.53	44.37	20.86	
12	K	10.62	48.97	45.46	21.20	
13	N plus P	6.17	75.71	45.31	21.17	
14	N plus K	10.22	42.24	44.06	20.78	
15	P plus K	8.37	52.10	44.22	20.37	
16	N plus P plus K	11.37	47.30	43.59	20.78	
	II. Nitrogenous manurial series.					
	Unlimed.—					
17	Check	3.12	28.38	36.87	17.16	
18	Oilcake	4.56	22.22	37.50	17.17	
19	Ammonium Sulphate	4.67	27.36	37.82	17.43	
20	Nicifos	4.58	27.40	37.19	17.02	
21	Sodium Nitrate	4.10	27.96	37.50	17.53	
	Limed.—					
22	Check	6.69	34.87	39.06	17.88	
23	Oilcake	10.99	20.00	39.08	18.08	
24	Ammonium Sulphate	6.70	32.71	40.94	19.24	
25	Nicifos	5.77	31.30	41.56	19.72	
26	Sodium Nitrate	8.02	31.36	40.92	18.79	

Serial No.	Treatment	Floats per cent	Hard beans in floats per cent	Wet parchment per cent	Moisture free parchment per cent	Remarks
	III. PHOSPHATIC MANURIAL SERIES.					
	Unlimed.—					
27	Check	3.75	30.54	38.12	17.80	
28	Super	3.46	25.63	38.75	17.58	
29	Basic Slag	5.31	25.71	39.06	17.78	
30	Steamed Bone	3.12	29.59	39.06	17.74	
31	Raw Bone	5.31	24.88	38.12	17.51	
	Limed.—					
32	Check	4.06	27.65	37.19	17.08	
33	Super	2.81	26.63	38.44	17.35	
34	Basic Slag	2.81	34.45	37.19	16.85	
35	Steamed Bone	4.06	28.19	37.50	16.97	
36	Raw Bone	2.81	26.63	37.19	16.86	
	IV. POTASH SERIES.					
	Unlimed.—					
37	Check	4.06	27.11	38.12	18.53	
38	Potassium Sulphate	2.19	28.19	38.75	19.26	
39	Potassium Chloride	2.81	30.54	39.37	18.78	
	Limed.—					
40	Check	4.06	26.02	39.69	19.24	
41	Potassium Sulphate	3.44	25.63	39.37	18.98	
42	Potassium Chloride	3.12	24.66	39.69	19.10	
	V. 8-ACRE BLOCK I SERIES.					
43	Check	3.70	25.00	40.00	17.78	Samples taken from the 1st picking except the sample from mixture 10 (in 8-acre block) which was from II picking.
44	Mixture 1	6.52	25.00	37.82	17.26	
45	Mixture 5	5.41	30.89	38.44	17.65	
46	Mixture 6	6.87	28.85	38.44	17.58	
47	Mixture 7	6.52	33.11	39.37	18.68	
48	Mixture 8	8.06	32.24	42.18	18.97	
49	Mixture 9	7.40	33.93	40.94	19.10	
50	Mixture 10	2.51	29.80	42.35	19.36	
51	Mixture 11	9.21	32.54	40.84	18.70	
52	Mixture 12	9.47	33.49	38.80	17.30	
	V. 8-ACRE BLOCK—*(contd.)* II SERIES.					
53	Check	5.65	36.67	42.35	19.74	Sample taken from 1st picking.
54	Mixture 1	7.80	36.72	41.25	19.05	
55	Mixture 2	7.67	35.05	39.84	19.72	
56	Mixture 3	5.68	33.34	41.25	19.40	
57	Mixture 4	6.26	30.10	40.94	19.24	
	III SERIES (TIME OF APPLICATION OF MANURES).					
58	Check	6.39	43.44	45.00	20.29	
59	Complete manure after monsoon	9.78	40.53	43.43	20.36	
60	Complete manure before monsoon	7.45	36.09	43.90	20.65	
61	Complete manure ½ before and ½ after monsoon.	8.19	43.01	43.90	20.04	
	IV SERIES (DIFFERENT DOSES OF COMPLETE MANURE).					
62	Check	3.96	26.67	42.50	20.18	Sample taken from 1st picking.
63	Complete manure single dose ..	7.58	40.12	42.81	20.29	
64	Complete manure 1.5 dose ..	4.71	38.32	42.81	20.07	
65	Complete manure 2 doses ..	3.92	47.19	42.35	20.09	
	VI. VARIETAL SPRAY SAMPLES.					
66	Check	2.11	33.33	44.38	20.38	Samples taken from second picking.
67	Linseed 10	2.42	34.54	42.04	19.98	
68	Linseed 20	2.56	34.03	44.52	20.42	
69	Linseed 40	3.66	30.11	43.59	20.29	
70	No adhesive Bordeaux ..	4.10	53.76	41.25	19.75	
71	Casein Bordeaux	3.35	38.16	41.87	19.71	
72	Resin Bordeaux	2.95	29.85	40.32	19.36	
73	Alum Bordeaux	2.56	27.58	41.56	19.43	
74	No adhesive Burgundy ..	2.60	42.36	42.35	20.16	
75	Resin Burgundy	3.83	42.53	42.18	19.74	
76	Fish oil Resign Burgundy ..	2.86	38.46	41.07	19.64	

Serial No.	Treatment	Floats per cent	Hard beans in floats per cent	Wet parchment per cent	Moisture free parchment per cent	Remarks
	VII TIME AND STRENGTH OF SPRAYING SAMPLES.					
77	Checks I & II	4.09	29.03	45.62	20.79	Sample taken from second picking.
78	Pre and Post monsoon 1% ..	4.18	34.73	43.75	20.70	
79	Pre monsoon 1%	3.40	34.72	42.96	20.14	
80	Checks III & IV	3.40	16.66	43.44	20.33	
81	Pre and post monsoon ½% ..	4.41	34.00	42.96	20.53	
82	Pre moonsoon ½%	2.77	33.33	42.35	20.55	
83	Check V, VI and VII	3.48	30.38	45.62	20.79	
84	Post monsoon 1%	3.74	30.59	44.06	20.08	
85	Post moonson ½%	5.29	32.50	42.5	19.28	
	I. GENERAL MANURIAL SERIES.					
1	Unlimed (K)	1.98	26.56	41.56	19.64	
	Limed.—					
	Check	2.51	21.58	40.94	17.98	
	N plus P plus K	2.26	28.82	40.32	17.41	
	II. NITROGENOUS MANURES SERIES.					
	Unlimed.—					
	Cake	1.89	32.65	42.04	19.39	
	Na NO3	1.76	45.0	41.40	19.55	
	Limed.—					
	Am Sulphate	3.17	27.77	42.04	19.87	
	III. PHOSPHORIC ACID SERIES.					
	Unlimed.—					
	Super	2.60	30.51	42.50	20.10	
	Limed.—					
	Check	2.95	32.83	42.35	19.95	
	Steamed Bone	2.60	28.80	42.50	19.77	
	IV. POTASH SERIES.					
	Unlimed.—					
	Check	2.33	28.30	41.87	19.83	
	KCl	2.16	28.57	41.72	19.45	
	Limed.—					
	K2 SO4	1.85	23.81	42.18	19.72	

TABLE XXII.

Abstract of yields of Areca Manurial Experiments at Marthur Farm.

Treatment 1921–23	Yield (in lbs.) of dry nuts per acre				Treatment during 1924–26	Yield (in lbs.) of dry nuts per acre				Treatment during 1927–32	Yield (in lbs.) of dry nuts per acre						
	1921	1922	1923	Average for 1921–23		1924	1925	1926	Average for 1924-26		1927	1928	1929	1930	1931	1932	Average for 1927-32
Check ..	569	535	780	628	Sulphate of Ammonia and Potash.	765	748	888	800	Check (residual effect of 1924-26.) manuring.	682	612	501	543	580	609	603
Do ..	448	406	578	518	Sulphate of Ammonia and Super and Potash.	643	804	854	767	Do	773	641	624	506	687	614	641
Do ..	612	450	713	620	Cake and Potash ..	707	710	950	786	Do ..	685	669	565	637	567	659	630
Do ..	528	490	731	588	Cake and Super and Potash.	681	764	900	787	Do ..	778	643	630	597	748	661	676
Average ..	539	493	700	588	Check (residual effect of 1921-23.) manuring.	756	726	840	774	100 lbs. N. Cake 400 lbs. P2O5 super 100 lbs. K2O (K2SO4)	660	674	745	752	860	835	714
G. N. cake ..	730	686	856	757	Do	802	663	821	762	100 lbs. N. Cake, 400 lbs. P2O5 (Super) 200 lbs. K2O (K2SO4).	540	673	745	691	640	802	682
G. N. cake and Super.	650	697	852	733													
G. N. cake and Super and Potash.	948	822	942	904	Do ..	988	762	1073	941	100 lbs. N Cake 150 lbs. P2O5 (Super) 200 lbs. K2O (K2SO4)	594	720	753	862	749	784	744
										50 lbs. N. Cake 75 lbs. P2O5 (Super) 100 lbs. K2O (K2SO4)	662	761	787	834	781	873	786
Sulphate of Ammonia.	787	697	850	778	Do ..	716	655	769	713	100 lbs. N. Nitrolim 150 lbs. P2O5 (Super) 200 lbs. K2O (K2SO4)	583	662	807	809	740	814	736
Sulphate of Ammonia and Super.	727	728	825	760	Do ..	664	659	777	700								
Sulphate of Ammonia and Super and Potash.	803	749	856	803	Do ..	896	660	865	807	100 lbs. N. (Am2SO4,) 150 lbs. P2O5 (Super) 200 lbs. K2O (K2SO4)	640	710	797	724	720	739	722

Table XXIII.

BABBUR FARM.

Plot Experiments. (*a*) Cotton Block I Unmanured. Season 1932-33.

Serial No.	Check	N	N & P	N & K	P & K	N & P & K	Remarks
1	10.12	9.00	9.75	9.87	10.75	12.50	
2	9.00	9.25	8.25	8.37	9.00	12.50	
3	8.75	10.25	8.75	8.00	10.12	9.00	
4	8.37	9.87	13.00	7.75	9.37	8.12	
5	10.25	9.00	10.00	10.50	9.50	9.50	
6	8.00	11.75	10.50	10.50	10.50	11.50	
Total ..	54.49	59.12	60.25	54.99	59.24	63.12	
Mean yield (in lbs.) of kappas per plot.	9.08	9.85	10.04	9.16	9.88	10.52	

Plot Experiments. (*b*) Cotton Block II Manured. Season 1932-33.

Serial No.	Check	N	N & P	N& K	P & K	N & P & K	Remarks
1	11.00	9.50	10.00	10.00	10.00	10.50	
2	9.00	9.25	11.00	9.25	10.00	8.50	
3	9.50	10.75	9.75	9.50	9.50	8.50	
4	10.50	11.50	10.00	10.00	8.75	9.50	
5	8.50	12.25	12.00	9.50	11.75	12.00	
6	10.75	12.00	10.50	10.50	9.75	10.00	
Total	59.25	65.25	63.25	58.75	59.75	59.00	
Mean yield (in lbs.) of kappas per plot.	9.88	10.88	10.54	9.79	9.96	9.83	

(*c*) BABBUR FARM.

Cylinder Experiments.

Cotton-Season 1932-33.

Serial No.	Check	N	N & P	N & K	P & K	N &P & K	Remarks
1	3.30*	2.0	8.00	3.25	4.25	5.50	
2	2.00	2.75	5.50	2.75	8.00	5.50	
3	3.00*	3.30*	4.25	4.75	8.25	3.75	
4	2.70*	2.50	5.00	3.00	6.00	4.75	
Total	11.00	10.55	22.75	13.75	26.50	19.50	*yield of 5 plants calculated to 6 plants.
Mean yield (in lbs.) of kappas per cylinder.	2.75	2.64	5.69	3.44	6.63	4.88	

Table XXIV.

BABBUR FARM.

Plot Experiments.

A. Series—Jola Manured Block I—Season 1932-33.

Serial No.	Check	N	N & P	N & K	P & K	N &P & K	Remarks
1	8.0	2.25	8.50	3.00	6.50	0.50	
2	6.0	7.25	2.50	5.50	6.00	11.50	
3	10.5	14.00	6.25	1.25	9.75	10.50	
4	4.5	1.25	11.12	10.25	15.75	9.00	
5	8.5	5.25	10.00	10.50	3.12	5.00	
6	6.5	17.50	13.75	16.75	10.00	21.50	
Total	44.00	47.50	52.42	47.25	51.12	58.25	
Mean yield (in lbs.) of grain per plot.	7.33	7.92	8.73	7.88	8.52	9.71	

Plot Experiments.

B. Series—Jola Unmanured Block II—Season 1932-33.

Serial No.	Check	N	N & P	N & K	P & K	N & P & K	Remarks
1 ..	16.25	10.50	21.50	16.50	26.25	6.12	
2 ..	15.25	18.25	5.00	12.00	17.50	11.00	
3 ..	16.75	15.50	10.00	5.12	16.00	13.25	
4 ..	16.25	11.00	17.50	18.25	14.25	21.00	
5 ..	24.00	23.00	21.50	16.50	17.75	19.00	
6 ..	12.75	19.50	18.00	24.00	17.50	24.00	
Total	101.25	97.70	93.50	92.37	109.25	94.37	
Mean yield (in lbs.) of grain per plot.	16.88	16.28	15.58	15.39	18.21	15.73	

Table XXV.

BABBUR FARM.

Cocoanut Experiments.

July 1931—June 1933.

Season	Average number of nuts harvested per acre (40 palms per acre)						
	Check	2 (N & P &K)	N & P & K	N & K	N	2 N & P & K	N & P & K/2
1 July—Dec. 1931 ..	1000	1160	960	920	1160	1480	960
2 Jan.—June 1932 ..	880	880	800	840	1160	1000	1000
3 July—Dec. 1932 ..	920	880	1120	1160	760	1040	960
4 Jan —June 1933 ..	720	760	800	720	920	800	760
Average for 1 season.	880	920	920	920	1000	1080	920

Table XXVI.

Yield of Grass Manurial Experimental Plots on the Cattle Breeding Station, Ajjampur, 1932-33.

Plot I	Check	342 lbs.
II	Manured	496 ,,
III	Check	326 ,,
IV	Manured	738 ,,
V	Check	528 ,,
VI	Manured	701 ,,
VII	Check	501 ,,
VIII	Manured	699 ,,
IX	Check	626 ,,

ANNUAL REPORT OF THE GOVERNMENT EXPERIMENTAL FARM, HIRIYUR, FOR THE YEAR 1932-33.

Administration.—I continued to be in charge of the Farm during the whole year. Inspector Mr. D. Srinivasa Rao in charge of Dry area was transferred to Irwin Canal Farm, Mandya and was relieved of his duties here on 5th July 1932 by Mr. Abid Hussein who also was transferred to Cattle Breeding Station being relieved on 19th February 1933. Mr. K. S. Raja Rao joined his duties on the Farm on 14th March 1933.

The Wet Land Inspector Mr. K. Nagesha Rao was transferred to Kodihalli Farm, Mandya and was relieved on 22nd December 1932; Mr. P. Kalingappa posted in his place joined duty on 28th February 1933.

Seasonal Conditions.—The total rainfall during the year was 39·05″ as against 13·77″ in 1931-32 and 21·235″ above the average of past fifteen years. The precipitation of this quantity was, on seventy-four days, most of it falling during the months of August and October 1932 and May 1933 (*vide* Statement No. 1). It was more at the time of sowing jola but good for cotton in all its stages of growth. But for these heavy rains sugar-cane in wet land would have been a failure as it had suffered for want of water for the first seven months of its growth up to the time of these rains. Vani Vilas Sagar also received its full supply of water which was allowed to flow continuously in the Channel for growing paddy in Summer.

Farm Buildings and Roads.—The replacing of the thatched roof of office and stores with corrugated iron sheets was completed during this year and the office was floored with Kadapah slabs. The roofing of the rear varandah of office and stores with corrugated iron sheets is in progress. As reported last year, urgent necessity is felt for the stores being extended by enclosing the varandahs to take in all sorts of stock accumulated for a long time and the produce of more crops now dealt with on the Farm. The Junior Assistant Botanist working on cotton who was hitherto stationed in Hiriyur was accommodated on the Farm in the newly built Inspector's quarters.

Machinery.—The Peter Horizontal Engine and the Massey Sugar-cane Mill bought 15 years ago have become badly worn and need to be replaced so as to ensure efficient milling of cane and other operations of the farm.

Gins.—(Pratts) of the Farm worked for 117 days and the quantity of lint ginned amounted to 4,637 maunds and 27 lbs. of the raiyats and 112 maunds of the Farm, and the former brought in a revenue of Rs. 2,333-4-3 as against Rs. 1,274-11-3 in 1931-32. Thus the gins have released about 14,000 maunds of seed.

There was an outbreak of Blackquarter in the Farm in June 1933 and all the Government animals and those of the colonists were protected in time.

The Breeding Bull.—Supplied in 1928 continued in service. The coverings during the year were thirty-nine against thirty-eight in 1931-32, forty-four in 1930-31 sixty-seven in 1929-30 and sixty-three in 1928-29.

A. Dry area.

Of the total acreage of 90 acres and 15 guntas of this area, the usual 65·79 acres which are available for cultivation excluding bunds and roads, were put under the following crops :—

Cotton	..	29·44 acres
Jola	..	23·02 ,,
Horse-gram	..	5·11 ,,
Bengal-gram	..	2·17 ,,
Sisal	..	4·00 ,,
Miscellaneous crops like wheat, Navane, Thogari, Soy beans, etc.	..	·53 ,,

Cotton. (*a*) *Breeding.*—9·94 acres were devoted for this work done by the Botanical Section and the result of the same will be found in his report.

(*b*) *Manurial.*—1·8 acres were devoted for the trial of artificial fertilizers on this as well as on jola and the residual effect of the same on cotton in the two-year rotation Jola first year and cotton second year. The results are dealt with in the report of the Agricultural Chemist.

(*c*) Multiplication of improved strains and of S. 69 of sannahatti (19·5 acres). The performance of these strains is as under—

Sel. 69	.. ..	8·4 mds. per acre.
Sel. 69/1	.. ..	6·5 ,,
Sel. 69/3	.. ..	5·5 ,,
Nadam like 21/22	.. ..	5·75 ,,
Nadam like 149/52	.. ..	4·50 ,,
Herbaciumlike	.. ..	6·00 ,,

Doddahatti (M.A. IV 25-25) had occupied ·37 acre in demarcation line and yielded 53 lbs. which works upto 5 mds. and 3 lbs. per acre.

All pure seeds of Selection 69 amounting to 80 mds. were made available for distribution to 'A' Seed Farm growers of the District.

The average yield of cotton in the area of 13·13 acres of multiplication and manurial plots works up to 9·5 maunds per acre as against 6 maunds in 1931-32.

Insect Pests and Diseases.—Though bud and stem borers and wilt were observed, the severity of attack and damage was far less than last year.

The sowing had been done on 6th, 9th, 12th and 15th September 1932.

2. *Jola.* (*a*) *Breeding.*—7·3 acres were devoted for this work by the Botanical Section in whose report the results are dealt with.

(*b*) *Manurial Experiments.*—1·8 acres were devoted for cotton, for the trial of artificial fertilizers on the crop by the Agricultural Chemist, whose report deals with the result.

(*c*) *Fodder.*—15·72 acres in three blocks were put under fodder. The average yield was 97 seers of grain and 6 tons of straw per acre as aginst 24 seers of grains and 4 tons of straw in 1931-32.

Insect Pest and Diseases.—The attack of borer and striga was observed to be less than that of last year. Spraying with ferrous sulphate had no effect on striga. A new set of experiments for controlling striga was laid down in this year, in consultation with the Mycologist. The result will be available for report next year.

3. *Horse-gram.*—5·11 acres were sown with horse-gram. The yield amounted to 960 seers giving an average of 188 seers per acre as against 83 seers in 1931-32.

4. *Bengal-gram.*—2·17 acres in two blocks 164-c iii 1·06 and 165-c.v. 1·11. The yield amounted to 190 seers which works upto 87·5 seers per acre as against 124·42 seers in 1931-32.

5. *Sisal.*—4 acres. The area under the crop continued the same as that planted in 1924-25, many plants poled and were therefore removed and the blanks replanted. The leaves cut during the year fully met the requirements of the Farm for ropes.

Silage.—The two silo trenches referred to in the reports of the previous years were all filled with the following fodder jola and sun flower from wet land :

	Green material put in.				Taken out				Percentage of shortage and wastage.
	Tons.	Cwts.	Qrs.	Lbs.	Tons.	Cwts.	Qrs.	Lbs.	
1st Pit	27	16	3	4	17	9	0	2	37·3 per cent.
2nd Pit	34	4	2	10	22	16	1	0	33·35 ,,

The material was cut into $\frac{3}{4}$' to 1' bits for want of Chaff Cutter. The percentage of wastage is very high owing to the uneven surface and very deep depressions in the sides of the present silo pits.

Artificial Farm Yard Manure.—Prepared two years ago was found to have decomposed well enough for use in the sugar-cane plots. New pits with fresh material were again put in with a small portion of the old material as starter for the coming year.

B. Wet area 128 acres and 11 guntas.

39·047 acres are either occupied by roads, buildings, drains or are used as grazing grounds and 88·955 acres were cropped during the year as follows:—

1.	Sugar-cane	15·33 acres.
2.	Cotton	14·50 „
3.	Ground-nut	15·145 „
4.	Tobacco	1·86 „
5.	Chillies	1·00 „
6.	Fodder Jola	15·86 „
7.	Sunn hemp	15·12 „
8.	Sunflower	0·50 „
9.	Soy beans in demonstration line	..
10.	Plantains	2·5 „ inter-planted with cocoanuts also.
11.	Areca garden nursery and orchard	1·25 acres.

1. *Sugar-cane.*—15·33 acres in S. No. 511-12, 513, 514, and 523 is the principle money crop under experiment on the farm and continued to be grown from 1925-26 in a five-year rotation for reasons explained in the report for 1924-25. As already mentioned under seasonal conditions, the crop suffered much on account of not only adverse seasonal conditions but also change of programmes in the flow of water in the channel from Vani Vilas Sagar for more than first eight months of its growth. The attack of borer and white ants also was very bad. The failure of the crop was averted only by the good hingar rains. The average yield per acre worked up 18·65 tons as against 28·2 tons in 1931-32 (*vide* Statement II).

The following are the trials conducted with this crop:—

1. *Manurial.* (*a*) *Artificial Fertilizers.*—2·50 acres in S. No. 513 Experiments to determine firstly, the general manurial requirements of the crop, secondly, the effect of double and trible doses of ammonium sulphate and superphosphate mixtures and thirdly, the effect of new artificial fertilizers were conducted by the Agricultural Chemist and the results will be found in his report.

2. *Varietal.* (*b*) *Under Varietal.*—1·05 acres in S. No. 523 Seven varieties of cane were under trial as in the last two years. There were many blank patches in some series and growth was not uniform. Therefore the results of this year cannot be taken into account in considering the merits of the varieties. However the relative yields of all the varieties tried for the past thirteen years are given (*vide* Statement IV).

Thin canes; *viz.*, J. 33 A and H.M. 602 are topping the list as first and second. Rastali has taken the third rank followed closely by H.M. 553. B. striped and H.M. 320 and H.M. 544—all thick canes come last indicating that in a bad year under the conditions of soil and water prevailing on the farm that thin canes fare better than thick canes. Two more Hebbal seedlings, *viz.*, H.M. 001 and H.M. 004 have been selected from the Botanical collections and all the nine have been planted in January 1933, for comparative trials.

1. Manurial (*b*) Cattle Manure double (20. c.l.) *Vs.* single (10. c.l.) dose 1·05 acres in S. No. 523.

The results for all the years the experiment is in progress on the Farm is tabulated (*vide* Statement No. III). The results indicate that there is no advantage in increasing the basal dose of cattle manures to more than 10 tons as the increase due to the 20 tons dose has hardly been significant enough.

Seedling and other Canes.—0·46 acre in S. No. 523.

Twenty-eight of these of Hebbal, Coimbatore and Java kindly supplied by Economic Botanist and two selected on the Farm are under trial for the past two years. Some of them are the world's best canes; *viz.*, PoJ 2878, PoJ 100 and E.K. 28. The yields of these small scale tests are tabulated in Table IV (1).

Local Pattapati 003-5 and H.M. 500:—·80 acre and ·25 acre respectively in S. No. 503-4S. They had come up well in 1931 in 9 months and had been planted out in September of that year to see how far they would behave in maintaining earliness and yield. They came to maturity only by October 1932, that is, only after a full year and further more were found very low in sugar content.

Control of Insect Pests.—The attack of borers and white ants was very bad due probably to be adverse seasonal condition mentioned. The former was tried to be controlled by hand picking of moths and collection of egg masses and by parasitization under the supervision of the Entomological Section. The latter was controlled by the waste oil and water mixture.

Planting of the year.—An area of 14·625 acres is planted in January and February 1933.

The attack of borers was visible on this crop also but far less when compared with that of last year, there being continuous flow of water in the Channel and favourable rains. The Entomological Section conducted trials in controlling the pests by parasitization of egg masses and catching moths by trash, heap method and collection of egg as last year.

Jaggery Boiling.—All the cane crop available for milling, *viz.*, 244·4 tons was crushed with the power mill (noted under machinery) and boiled down to jaggery in the triple pan furnace which amounted to1,807 maunds 19½ lbs. as against 2,455 maunds 8 lbs. in 1931-32. Percentage of jaggery to cane worked up to 9·3 as against 10·4 in 1931-32. The cost of manufacturing jaggery worked up to Re. 0-5-1 per maund asagainst Re. 0-4-11 in 1931-32. No fuel was purchased. Trash, begass, cotton stubbles and dried cocoanut leaves of the garden were made use of.

Tobacco which was planned for and for which land had been prepared could not be planted at all on account of too much moisture in the land.

Cotton (Irrigated).—14·5 acres in S. No. 261 N & S details and results of work done in the improvement of this cotton will be found in the report of the Botanical Section.

Ground-nut.—15·145 acres S. No. 515—3·5 acres, 516—3·57 acres; 517—18-4·0 acres; 518-19—4·035 acres. As last year, the crop was only tried as an alternative for paddy of the regular rotation. Yields are noted (*vide* Statement No. V).

There was very little of the attack of either "Surul puchi" or "Tikka" observed to be very bad last year.

Following trials were conducted with the crop:—

1. *Varietal.*—Three varieties, *viz.*, H.G. No. I Valencia both erect and mauritius spreading, of one-third acre each was grown and repeated three times. Of the erect varieties, the yields are almost same but Valencia matured twenty-five days earlier than H.G. No. I. Though the pods were big, the seeds inside the pods of the Valencia were not proportionate to the pods but thin and shrinken.

Soaked Vs. Unsoaked before sowing.—Seeds of Valencia variety of ground-nut was used for this trial on half acre plot and repeated three times. There was very little difference observed between the two.

Tobacco.—(1·86 acres in S. No. 503-4S). This was tried to be grown as a second crop in the year, following the first crop of Jola. Half an acre of the crop was experimented upon with Potash mixture supplied by the Potash Export Company. All failed on account of the water logging of the plots due to continuous heavy rains after planting. Seeds of Varieties received from Bettadapur side and Farm selections have been saved and kept pure by bagging a few plants.

Chillies.—One acre in S. No. 503-4 S. fared no better than the tobacco for the same reasons. No. 1 of the Marthur Farm was also tried along with local. Seeds have been saved.

Fodder Jola.—13·86 acres: In S. Nos. 262-502—6 acres, 503—4-N acres and 503-4S—3·86 acres. This was purely meant for fodder cut as hay and for ensilaging using a small quantity for feeding the cattle on the Farm as green stuff,(*vide* Statement No. VI).

Paddy.—Vani Vilas Sagar filled during the hingar rains of the year; water was allowed continuously in the channel to facilitate growing of summer paddy. An attempt was made to grow paddy here through tenants as a second crop in the year as the farm could not afford the necessary bullock labour for this cultivation. Only six acres of S. No. 262-502 was put under this crop, the variety being Halubbalu. The yield was 4,336 seers of grain and 5 tons and 13 cwt. of straw: that is, 722·6 seers of paddy and 9 tons of straw per acre. One-third of the above grain and one-half of the straw was the share of the Farm.

Sunn hemp.—15·12 acres in S. Nos. 505-6-7N—2·5; 508—3·25; 509—3·4; 524 N—2·50 and 526—3·37: Besides growing this crop as a green manure for sugar-cane 2·5 acres were cropped for seed purposes. The rains of the year were too much for the crop. The yields are given (*vide* Statement No. VII). One thousand and twenty-five seers of seed was supplied to the several ranges and farms.

Sunflower.—·50 acre in S. Nos. 262-502. This crop meant for ensilaging with fodder jola was a failure owing to water logging of the area due to heavy rains and all the crop was allowed to seed which 28 seers only.

Soy beans.—Nos. 16 and 30—Two strains have been maintained just on the demonstration lines. The plants had grown well in August sowing but not so well in January sowing.

Plantains.—2·5 acres in S. No. 263 continues to occupy this area as a preliminary to cocoanut planting. Only in one-thirds of the area reported last year, the plants are fairly good in growth and the rest two-thirds which is alkaline has not allowed any suckers to develop in the three plantings made last year and is blank. Twenty thousand, two hundred and fifty-three fruits were harvested during the year. Ninety-six cocoanut seedlings, 35 of which are Java varieties brought by Dr. Coleman in 1931 and interplanted among the plantains last year, are coming up well except for 8 which died on account of the attack of beetle.

11. *Cocoanut.*—8·75 acres in S. No. 506-7-8. Three hundred and firty-five palms planted in 1923-24. All the palms except 30 have come to bearing and 13,194 nuts were harvested during the year from 325 palms as against 14,515 in 1931-32. This gives an average of 42 per palm per year. The crop was not irrigated during the year. The results of manuring with artificial manure by the Agricultural Chemist will be dealt with in his report. One hundred and seventy-three nuts have been selected from 16 best yielding palms of the garden and planted in the nursery for purposes of further propogation and they are all coming up well now.

The palms in the garden have a healthy look about them in general indicating the successful growth of cocoanut palms under the soil, water and climate conditions prevailing on the Farm and this in spite of the heavy attack of black beetle.

Insect Pests of Cocoanuts.—The attack of black beetle (Orecites Rhinocere) is very severe though the age of the palms is running to ten years. The daily catch of these beetles in the adult stage has been resorted to by wiring method. On an average. 12 beetles are caught daily. Larvæ are also picked in the breeding places which are overhauled once in two to three months.

Garden, Nursery and Orchard.—1·25 acres in S. No. 264. The old garden which acquired with the Farm is maintained on this area.

1. *Areca.* (*a*) *Investigation on Anabe Roya.*—This being done under the Mycological Section.

(*b*) *General.*—The yield from the bearing palms 130 in number amounted to 7 maunds $47\frac{3}{4}$ seers or $383\frac{3}{4}$ srees as against 12 maunds 18 seers in 1931-32—150 seedlings transplanted in 1930-31 are thriving well.

Nuts selected from palm No. 4-2 sown in the Nursery also are all coming up well.

(*c*) *Bee-keeping.*—As some colonies of Apics Indica were observed to be present on the Farm in ant hills and hollows of trees, an attempt was made to catch and put them in modern hives to see how far bee-keeping would be successful on the Farm in particular and in this region in general. From March 1932 the number of catches made and the honey extracted are given (*vide* Statement Nos. VIII and IX). Decoy hives were of little use in catching the bees. Queens were clipped in most colonies before putting them into the hive.

Wax moth was observed in one colony and hornets are a pest visiting the hives almost daily after May in the year till September and October.

Honey extracted in different seasons is found to vary in colour, flavour and consistency depending upon the flowers available then.

All the honey extracted, viz., 20 lbs. 2 oz. was from an extractor made on the Farm. This money is sold at Rs. 1-8-0 per lb.

(*d*) *Other Activities.*—

(i) *Co-operative Society.*—The unlimited society organised last year was of much benefit for the labourers on the Farm: Rs. 709-10-0 have been collected as share capital and there are seventy-one members on its roll.

(ii) *School.*—The primary school continues to work with an average strength of 40 boys and girls.

(iii) *Library.*—There were no additions to the Library.

(iv) *Correspondence.*—Letters sent out amounted to 1,394 and letters received 1,263

H. VENKOBA RAO,
Manager, Government Experimental Farm,
Hiriyur.

STATEMENT I.

Statement showing the Rainfall on the Government Experimental Farm, Babbur, for the year 1932-33.

Serial No.	Month	1931-32		1932-33		Average for the past fifteen years
		Days	Rainfall	Days	Rainfall	
1	July	1	0·11	6	2·74	·93
2	August	3	0·45	19	11·20	1·02
3	September	7	3·88	4	0·59	4·33
4	October	2	0·40	16	9·40	3·84
5	November	7	4·81	10	3·35	2·24
6	December	6	1·86	1	·09	0·30
7	January	..	..	..	..	0·28
8	February	..	..	1	0·19	0·14
9	March	..	..	1	0·19	0·75
10	April	2	0·12	1	0·28	1·02
11	May	7	1·82	11	1·35	2·44
12	June	4	0·32	4	·17	1·18
	Total ..	39	13·77	74	39·05	18·47

STATEMENT II.

Statement showing the Sugar-cane Crop on the Government Experimental Farm, Babbur, for 1931-32 and 1932-33.

Particulars	1931-32	1932-33	Remarks
Area grown	13·84 acres	15.33 acres	
		T. cwt. qr. lbs.	
Total weight of cane harvested from all plots	391·11 tons	285 19 2 19	
Average yield of clean cane per acre ..	28·20 ,,	18 3 0 12	
Weight of cane used for seed purposes ..	98·90 ,,	41 12 0 12	
Weight of cane milled for making Jaggery	293·02 ,,	244 7 2 7	
Weight of Jaggery produced	2,455 mds. 8 lbs.	1,807 mds. 19½lbs.	
Percentage of Jaggery to cane	10·4	9.3	
Cost of manufacturing Jaggery per maund	Re. 0-4-11	Rs. 0-5-1.	

STATEMENT II (*a*).

Statement showing the details of yields of Sugar-cane grown in various plots during the year 1932-33.

Survey No.	Area	Particulars	Actual yield	Calculated yield per acre
			T. cwt. qrs. lbs.	T. cwt. qrs. lbs.
503-4S	·08 acre	Bulk H. M. 500	6 11 1 4	26 5 0 16
	0·25 ,,	,, Local pattapathi 003-5 ..	1 0 3 16	13 1 0 18
511-12	3·00 ,,	Bulk H. M. 602	64 10 0 5	21 10 0 0
	2·25 ,,	,, 553	51 0 3 0	23 0 0 0
513	2·50 ,,	Chemical experiment variety H.M. 602.	66 2 3 24	26 10 0 0
	1·25 ,,	Bulk H. M. 602	8 17 1 4	7 0 0 0 marginal
514	2·75 ,,	,, Babbur *striped* ..	40 8 0 16	14 13 3 13
523	0·04 ,,	,, H.M. 602	0 71 1 0	21 11 1 0
	0·65 ,,	,, 320	2 0 0 20	3 5 3 13
	1·05 ,,	Cattle manure experiment variety H.M. 553.	20 13 2 14	*marginal* 19 12 3 22
	1·05 ,,	Varietal	12 18 1 18	12 5 2 0
	·46 ,,	Botanical	10 9 3 8	5 14 3 12
Total	15·33		285 19 2 19	Average for the Farm 18·65

STATEMENT III.

Statement showing Cattle Manure Experiment of the Government Experimental Farm, Babbur, for the year 1932-33.

Quantity of Cattle manure used	1928-29	1929-30		1930-31	1931-32	1932-33
	H.M. 602	H.M. 553	Babbur striped	H.M. 553	H.M. 553	H.M. 553
Check 5 cart-loads	19 tons.	19·3	18·9	30·35	30·55	18·01
10 do	23·2	20·6	20·0	32·04	31·60	18·60
20 do	23·5	22·3	21·6	33·01	31·95	22·30
Average ..	of 14 repetitions on 2·1 acres.	of 24 repetitions on 1·8 acres of each variety.		of 9 repetitions on 1·05 acres.	of 7 repetitions on 1·05 acres.	of 7 repetitions on 1·05 acres.

STATEMENT IV.

Statement showing the results of trial of Varietal Canes from 1918-19 to 1932-33, of the Government Experimental Farm, Babbur, for the year 1932-33.

Serial No.	Variety of cane	1918–19	1919–20	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31	1931–32	1932–33
1	Red maritius ..	23·50	21·6	33.4	..	..	..	..	..	..	..	..	..	..
2	J. 33 A. ..	20·65	22·0	35.7	19·0	30·5	38·0	30·3	22·75	39·0	18·2	28·95	25·01	17·21
3	Java ..	17·00	..	..	..	..	..	..	..	..	..	..	..	..
4	Rastali ..	10·16	Not	tried		18·0	33·0	25·2	17·2	17·75	17·5	21·35	17·07	14·01
5	H.M. 544 ..	..	..	34.7	17·8	23·4	30·5	22·2	19·5	35·66	21·9	27·6	27·02	7·51
6	,, 602 ..	..	..	..	16·0	25·0	33·0	28·8	21·1	44·5	18·1	25·8	28·03	14·85
7	,, 553 ..	..	..	..	15·7	32·3	31·0	32·9	31·4	34·25	22·5	35·85	27·08	13·55
8	,, 376 ..	..	..	..	..	19·6	32·6			Eliminated				
9	Babbur striped ..	..	..	..	..	..	38·5	27·9	25·1	34.66	24·0	29·15	31·10	8·31
10	,, 320 ..	..	..	..	..	..	..	..	..	..	..	22·15	22·01	10·50

STATEMENT IV (*a*).

Statement of Botanical Varieties tried on the Government Experimental Farm, Babbur, during the year 1932-33.

Name of varieties	Area	Yield per plot	Yield per acre	Remarks
		cwt. qrs. lbs.	cwt. qrs. lbs.	
R.M. 27-6	0·02 cents	4 2 24	585 2 24	
H.M. 539	00·31 ,,	6 1 16	206 0 25	
Kassore 0019	2 ,,	8 2 20	433 3 20	
C.O. 204	2 ,,	9 0 16	457 0 16	
H.M. 332	2 ,,	8 1 12	417 3 12	
H.M. 320	2 ,,	8 2 16	442 2 16	
J. 33A 001	5·9 ,,	36 3 20	625 3 18	
H.M. 337	2 ,,	6 3 12	342 3 12	
C.O. 290	.8 ,,	1 3 0	218 3 0	
J. 33A. 004	2·7 ,,	19 2 8	724 3 13	
H.M. 487-00-17	2 ,,	7 2 16	382 0 16	
Local pattapathi 003-5 ..	2 ,,	13 0 20	658 3 20	
Thana striped	2 ,,	9 0 24	460 2 24	
J. 33A. white	2 ,,	9 2 16	482 0 16	
H.M. 544 striped	2 ,,	7 2 16	382 0 16	
J. 33A. striped	2 ,,	11 3 0	587 2 0	
E.K. 28	·66 ,,	0 0 24	32 1 24	
J. 213	2 ,,	9 3 16	494 2 16	
J. 33A. striped S.S. ..	·27 ,,	2 1 6	861 2 12	
C.O. 281	·53 ,,	0 1 20	85 2 24	
C.O. 313	·66 ,,	5 0 12	773 3 6	
C.O. 349	·66 ,,	2 2 0	378 3 4	
P.O.J. 2878	.2 ,,	0 2 16	321 1 20	
C.O. 205	·66 ,,	4 0 16	611 2 12	
C.O. 301	·53 ,,	4 0 24	795 0 16½	
P.O.J. 100	·53 ,,	0 0 16	26 3 23	
H.M. 500	1·1 ,,	3 2 12	327 3 19	
Local pattapathi 003-8 ..	1 ,,	4 2 12	460 2 24	
J. 139	2 ,,	0 1 16	19 2 16	
H.M. 165. 005	8 ,,	1 1 20	179 2 21	

STATEMENT V.

Statement showing the yields of Ground nuts on the Government Experimental Farm, Babbur, for the year 1932-33.

Serial No.	Particulars	Yield per acre		S. No. 516	S. No. 517-18 Soaked and *unsoaked trial of* three repetitions on 1½ acres. Each variety		S. No. 518–19		S. No. 515	
		1930-31	1931-32	Varietal trial of three repetitions on one acre of each variety	Actual yield of 1½ acres	Yield per acre	Bulk on 4·075 acres	Yield per acre	Bulk on 3·5 acres	Yield per acre
		mds.lbs	mds.lbs	mds. lbs.			mds.lbs.	mds. lbs.	mds. lbs.	mds. lbs.
1	H. G. I Erect type	24 20	19 4	33 27	Not tried		..	..	..	..
2	Valencia ..	Not tried	28 8	32 22	Soaked 26 20 unsoaked 25 12 Buck acre 19 11	17 22 16 27	63 9 actual yield	15 15	124½ 0	35 16
3	Spanish ..	23 8	Eliminated	..	..	..	..	..	..	..
4	Local ..	Failed	do	..	..	..	..	..	..	..
5	Maritius(spreading)	29 8	25 20	65 4	..	..	..	..	..	..
6	Mixture ..	..	..	5 11	..	..	..	..	..	..

STATEMENT VI.

Statement of Fodder Jola on the Government Experimental Farm, Babbur, for the year 1932-33.

Survey No.	Area	Total Tonnage	Tonnage per acre	Remarks
		T. cwt. qrs. lbs.	T. cwt. qrs. lbs.	
262—502	·5 acres	24 14 3 2	4 18 3 23	Green.
	·5 „	1 16 3 6	3 13 2 12	Hay.
503-4 N.	4 „	23 18 1 18	5 19 2 0	Green.
503-4 S.	0·50 „	1 15 2 25	3 11 1 22	Green.
	3·36 „	8 6 1 16	2 9 2 2	Hay.

STATEMENT VII.

Statement showing Sunnhemp grown for Green Manure and Seed purposes on the Government Experimental Farm, Babbur, for the year 1932-33.

Survey No.	Area	Total Tonnage	Tonnage per acre	Remarks
		T. cwt. qrs. lbs.	T. cwts. qrs. lbs.	
508	3.25 acres	15 9 0 0	4 15 0 9	Green manure
509	3.50 „	10 15 0 0	3 1 1 20	Do
524 N.	2.50 „	17 10 0 0	7 0 0 0	Do
526	3.37 „	17 16 2 18	5 5 3 7	Do
505-6-7 N.	2.5 „	Total yield 786 seers	Yield per acre 314 seers.	For seed.

STATEMENT VIII.

Statement showing the Extraction of Honey on the Government Experimental Farm, Babbur, during the year 1932-33.

Date	Quantity	Particulars of Colony with date of Catch	Quantity of Honey	Remarks
	lbs. oz.			
13-8-1932 ..	2 8	Five combs of hive No. 8 of 30th March 1932.	Light greenish brown probably of cocoa-nut.	Good flavour 1st extraction.
30-9-1932 ..	1 2	Three combs of hive No. 8 of 30th March 1932.	Do ..	IInd do
26-2-1933 ..	3 0	Six combs of hive No. 8 of 30th March 1932.	Reddish and thick	IIIrd do
8-4-1933 ..	5 0	Three combs of hive No. 8 of 30th March 1932.	Light yellowish thin	Do IVth do
		Three combs of hive No. 5 of 3rd June 1932.	Do ..	1st do
		Four combs of hive No. 13 of 13th April 1932.	Do ..	1st do
22-5-1933 ..	8 8	Ten combs of hive No. 8 of 30th March 1932.	Do ..	Good flavour 5th do
		Four combs of hive No. 13 of 13th April 1932.	Do ..	IInd do
		Three combs of hive No. 5 of 3rd June 1932.	Do ..	IInd do
Total ..	20 2	27 combs of hive No. 8 of 30th March 1932 in five extraction. 8 combs of hive No. 13 of 13th April 1932 in two extraction. 6 combs of hive No. 5 of 3rd June 1932 in two extraction.		
		41 combs at 5 lbs. per comb nearly.		

STATEMENT IX.

Statement showing the Catches of Bees on the Government Experimental Farm, Babbur, during the year 1932-33.

Date	No. of colony	No. of hive used	Remarks
			1931-32.
28-3-1932 ..	1st	8	Deserted on 29th March 1932.
30-3-1932 ..	2nd	8	Queen clipped. Removed to wet land on 13th April 1932
13-4-1932 ..	3rd	13	Do do 21st April 1932
21-4-1932 ..	4th	5	Deserted on 22nd April 1932.
25-4-1932 ..	5th	5	Removed to wet lands on 23rd May 1932. Deserted on 27th May 1932.
23-5-32 ..	6th	..	Babbur hive of dealwood. Queen clipped. Removed to wet lands on 30th May 1932.
30-5-32 ..	7th	5	Deserted on 1st June 1932.
3-6-1932 ..	8th	5	Queen clipped. Removed to wet lands on 21st June 1932. Very big colony.
			1932-33.
9-8-1932 ..	1st	2	Queen damaged. Supplied to Head Master, S.K.V.D. Patsala, Chikkanahalli through fieldman Appavoo on 9th August 1932.
23-9-32 ..	..	..	6th colony of 23rd May 1932, deserted from the dealwood hive.
20-12-1932 ..	2nd	12	Transferred from Decoi hive whereto it was attracted in wet lands during the last week. Removed to wet lands on 29th December 1932. Deserted on 21st April 1933.
6-3-1933 ..	3rd	..	Babbur hive of dealwood.
24-3-1933 ..	4th	..	No. S. of stand hive, deserted on 7th April 1933.
27-3-1933 ..	5th	..	Nil of do
31-3-1933 ..	6th	..	No 1 of do Queen clipped.
12-4-1933 ..	7th	4	Do
27-4-1933 ..	8th	5	Do
17-5-1933 ..	9th	12	Queen clipped. Deserted due to attack of red ants on 22nd May 1933.

STATEMENT X.

Programme of Work on the Government Experimental Farm, Babbur, for the year 1933-34.

(1) Repairs of existing buildings particularly houses which have developed dangerous cracks.
(2) Flooring to the Stores.
(3) Construction of pucca stall for Cattle.
(4) Extension of Cocoanut planting with seedlings raised from selected palms of the Farm and planting in S. No. 505-06-07N.
(5) Continuing the Manurial experiments on Cottons, Jola, Sugar-cane with the same five years rotation for Sugar-cane.
(6) Testing of seedlings and other canes as usual and growing the picked up varieties as bulk.
(7) Construction of Silos.
(8) Testing of new strains of Cotton with S. 69 and making pure seeds of the same available to "A" Seed Farm.
(9) Replacement of Massey Mill and Peter Engine which have served more than fifteen years and have become inefficient.
(10) Replacement of Carts and bullocks and buying some five more pairs.
(11) Replacement of the present Breeding Bull.
(12) Continuing the experiment on Striga control on Jola.

H. VENKOBA RAO,
Manager, Government Experimental Farm, Hiriyur.

REPORT ON THE IRWIN CANAL FARM FOR THE YEAR ENDING WITH 30TH JUNE 1933.

Staff.- Mr. S. H. Benmur continued in charge of the Farm till 19th January 1933, when Mr. C. V. Ramiah took charge. Messrs. A. Venkataramaiah and D. Srinivasa Rao, Agricultural Inspectors continued their services on the Farm.

The Store Clerk was on combined leave from 1st October 1933 to 7th February 1934 on account of ill health, and one of the maistries acted for him during that period.

Mr. D. P. Lakshminarasimhiah was appointed as temporary Agricultural Inspector for one year from 5th November 1932 to look after Botanical work on the Farm.

Seasonal conditions.--Early showers began in March 1932, and the total rainfall of 28.85 inches during the period under report was well distributed, the heaviest rainfall of 2.20 inches was on 27th April 1932. The largest amount of rain during any one month was during October 1932 when 9.52 inches were recorded. As usual in the area, summer was very severe.

Crops.—The Farm was opened in July 1931 and an area of 10 acres of waste land was planted with H.M. 320 cane from the Hebbal Farm. An area of two acres was put under different varieties of cane.

H.M. 320 began to be harvested from January 1932 for seed purposes and was planted on an area of nearly 200 acres between January and August 1932. This area of 200 acres was harvested continuously for seed from February 1933 onwards. Over 150 lakhs of setts have already been distributed to raiyats, and for planting on the new cane stations recently opened out.

During 1931-32, the area of 10 acres had been divided into plots of $\frac{1}{2}$ of an acre each. Cane from each plot was harvested separately. The number of setts obtained per acre from each plot varied from 1,20,000 to 1,94,000 according to age of the crop harvested. The weight of 1,000 setts from different plots varied between 520 and 660 lbs. The tonnage of the crop varied between 31 and 53 tons per acre according to the age of the crop.

The whole area had been manured with 1 cwt. of Sulphate of Ammonia and 1 cwt. of Concentrated Super per acre at the time of planting, 2 cwts. of Ammonium Sulphate about eight weeks after planting, and 10 cwts. of Groundnut Cake and 3 tons of compost manure at the time of earthing up.

To study the effects of an organic manure like compost, six plots had been left without the application of that manure. The crop from these plots varied between 32 to 34 tons per acre in the earlier harvested series, and from 44 to 49 tons in the later harvested series. In the plots treated with compost and harvested at about the same time, the yields varied between 32 and 42 tons in the early series and between 45 and 52 tons per acre in the later series. On comparing the average yields from non-compost and compost plots at different stages of growth, it was found that the non-compost plots yielded 33 tons per acre, and the compost plots 37 tons per acre at the age of seven months, 42 and 44 tons respectively at nine months, and 48 and 54 tons respectively at 11 months.

Coming now to the varietal tests, the yields were as follows :—

Variety.	*Yield in tons per acre.*
H.M. 544 Striped	59.9
H.M. 544	59.5
J. 33. a 001	58.3
H.M. 602	56.3
Local Striped	55.9
H.M. 320	54.0
L.S. 0-0-$\frac{3}{4}$	48.3
J. 33.A 0-0-4	48.0
H.M. 520	42.1

Agri.

Each variety was grown on three different plots of $\frac{1}{5}$ acre each. As already stated, cane planted in 1932 began to be harvested for seed from February 1933 onwards. The yields have varied from 21 to 28 tons per acre from areas planted before June, and from 11 to 15 tons from areas planted subsequently. For the later plantings there was no time to plough the land early and allow it to weather sufficiently. Moreover, the lands had just then been acquired from raiyats and were badly infested with hariali and other grasses and weeds. The number of setts per acre varied between 76,000 and 1,13,000 from the earlier planted areas, and between 51,000 and 72,000 from the later planted areas.

The whole area had been manured with 1 cwt. Ammonium Sulphate and 1 cwt. Concentrated Super per acre at planting, 4 cwts. Ammonium Sulphate in two doses about six to ten weeks after planting, and three tons of compost at earthing up.

The original area of 10 acres was ratooned in 1932 and manured with 2 cwts. of Ammonium Sulphate and 3 tons of compost per acre. From an area of six acres harvested for seed in 1933, the yield was about 19 tons per acre, and the number of setts obtained 1,13,000 per acre.

Of the 200 and odd acres planted in 1932, the harvested area has been ratooned and manured with 6 cwts. of Ammonium Sulphate per acre in two doses at invervals of one month, and with 3 tons of compost per acre at earthing up time. The growth is very promising, and the tillering is very profuse. Of the different methods of ratooning tried, burning the trash on the spot after harvest of plant cane and ploughing up the ridge very close to the stubble seems to reduce grassy growth of fresh shoots and contribute towards profuse tillering and formation of cane by the majority of tillers.

Besides the production of seed for distribution on a large scale, some manurial experiments were also laid out in 1932. The dose of Ammonium Sulphate was raised to 10 cwts. per acre reducing the application of organic manure proportionately to keep constant the amount of nitrogen applied per acre. The crop was not allowed to mature, but cut for seed. The best yield was obtained from the series to which 5 cwts. of Ammonium Sulphate and 3 tons of compost had been applied, and it worked up to 43.4 tons of cane per acre. The very same experiments are now being repeated and the crop will be allowed to grow to maturity.

Experiments to find out the Potash requirements of sugar-cane were also laid out in 1932, and the amount of Sulphate of Potash applied varied between 2 to 8 cwts. per acre. These experiments are also being repeated in 1933 planting.

In addition to above items of work on sugarcane, an area of nearly 20 acres was devoted to work on paddy. Halubbalu paddy was grown as a summer crop in 1932 on nearly 2 acres of land coming under crop for the first time. The yield on good soil was nearly 1,800 seers per acre, and that on bad stony soil about 900 seers per acre. Both the plots had been given artificial manures at 100 lbs. Ammonium Sulphate and 150 lbs. ordinary Super per acre just at the time of transplanting.

Besides, G.E.B. 24 was tried as monsoon crop on 16 acres coming under crop for the first time and yielded at the rate of 700 seers of grain per acre. Other varieties tried as monsoon crop were Pattasamanahalli sanna, Chintamani sanna and Nagpur fine on areas ranging from $2\frac{1}{2}$ acres to 20 guntas. The yield from these varieties was 930 seers, 895 seers and 540 seers, respectively per acre.

Trial of different varieties of cotton was not a success, but will be repeated some time later on. Dharwar and Khapile wheats were tried. Both suffered from rust, but the attack in the case of Dharwar wheat was not severe.

Other crops tried are H.G. 1 and Valencia groundnut, chillies and tobacco. Though the crop produced was not bad, chillies and tobacco were not found to be profitable under the prevailing conditions. Trials will be repeated this year also to find out if their cultivation can be made profitable at all.

To supply enough fodder for 36 pairs of bullocks on the Farm, fodder jola was grown on about 50 acres of land. The yield was about 4,800 lbs. of green material per acre. Horse gram was also grown on about 20 acres of land and the yield was 130 seers of grain per acre.

The Botanical Section has tried a number of Ragi and sugar-cane varieties, and the results obtained may be found in the report of that Section.

Irrigation experiments on the frequency of watering sugar-cane at various stages of growth are also in progress, and the quantity of water used at each irrigation is being measured by the Irrigation Department.

After the canes were earthed up, the system of irrigation to the crop was altered with a view to (1) reduce the labour involved in irrigation, (2) to utilise water flowing in the channel during nights which would otherwise have gone to waste. The system consists in laying stone checks along the sub-irrigation channel at each outlet into the cane field thus heading up the water and allowing water at heights to flow gently at 4 to 6 points in the sub-irrigation channels. Each main outlet commands an area of 10—15 acres with 4 or 5 sub-outlets. Water was shut off the next morning. The result was saving of labour, good soaking irrigation to the crop, and use of water in the channel during nights. As the system was found to be practicable, the whole cane area was laid out in this fashion and the new method of irrigation is being followed as a rule on the Farm.

Some of the raiyats who have seen this being done on the Farm, have copied it on their own fields. While once they were complaining that it would not be possible to irrigate sugar-cane during nights, they now express that the irrigation of sugar-cane during nights is possible and easy.

A new implement was devised on the Farm for Zig-Zagging the irrigation furrows. This consists of a spade to which an iron handle and two rings are attached. The implement is simple and costs about Rs. 3-8-0 each. This implement was used for earthing up and Zig-Zagging the sugar-cane fields on the Farm. A couple of them were lent to raiyats living in the vicinity of the Farm. They appreciated it so much that one of the raiyats in Shivalli, a village within one and half miles from the Farm, seems to have manufactured 70 or 80 of these and sold them to the raiyats.

Excluding capital and other non-recurring charges, the cost of running the Farm during 1932-33 has amounted to Rs. 62,008-13-7. This includes establishment and overhead charges as well. Of the above amount, about Rs. 15,000 are in connection with the cane crop of 1933-34, and cannot be counted as a charge on the crops as already harvested.

During the same period, the total receipts from the Farm including value of produce on hand amount to Rs. 66,679-13-2.

Work on the Farm, specially during seed distribution was very heavy. It is my pleasant duty to record that the staff worked cheerfully from early morning till late at night for a period of over five months continuously.

B. NARASIMHA IYENGAR,
Agricultural Chemist.

REPORT OF WORK DONE IN THE MYCOLOGICAL SECTION DURING 1932-33.

1. *Areca Koleroga.*—Due to recurdescence of koleroga in old areas, the demand for spraying materials and sprayers has been keen, and fresh supplies had again to be arranged for this year in the same manner as last year. Materials enough to spray about 9,450 acres were supplied during 1932-33 and the total transactions amounted to Rs. 24,142.

The Bhimankone Co-operative Society took chemicals worth about Rs. 1,700, enough to spray about 800 acres, and the Talakalkoppa Co-operative Society bought chemicals worth Rs. 306 enough for about 120 acres.

The growing demand for chemicals shows that the impression that had once gained ground with the Areca garden owners, that spraying is detrimental to the trees is gradually dying out. This, in a great measure, is due to the propaganda work carried out by the staff engaged in this work. The garden owners have been prompt enough to realise the truth of the situation. In the coming years, the demand is bound to be greater than ever.

The top-rot of arecanut which was slightly on the increase in 1931-32, was on the decline in 1932-33. There were only four deaths reported up to the end of June 1933. Koleroga did not appear on the Farm in the year under report.

(*a*) Spraying experiments were taken up on the Marthur Farm, to test the efficacy of cheap vegetable oils as spreaders in Bordeaux mixture. A portion of the garden was sprayed with Bordeaux mixture to which was added Gingelly oil, Groundnut oil, or Kuradi oil. The results obtained have been very promising. The significance of these results will be that Casein, which we are at persent purchasing from North India for spraying purposes, at a cost of nearly Rs. 10,000, can be supplanted by some of our cheap oils.

2. *Anaberoga of Areca.*—Out of the 38 palms inoculated with pure cultures growing on bits of cassia roots during November 1931 on the Babboor Farm, eleven were examined, five showed signs of fungus infections, the roots of two showed a slight discolouration, and the roots of four were healthy. Of the last four palms, two showed signs of yellowing of the crowns.

The above results having led to a suspicion that the check trees in the Eastern half of the garden might be too near the infected ones, a second set of inoculation experiments was carried out in the Western half of the garden during November 1932 in which three rows of check were left between two infected rows. The method was the same as in the previous set, but the inoculum was enclosed in glass tubes or cellophane paper and the points of inoculation were marked by planting iron stakes so as to facilitate examination later on. The inoculum was the original isolation from Amrutur, and a recent culture obtained from Tumkur. Eleven palms were inoculated with the Amrutur isolation and six with the Tumkur isolation. Each palm was inoculated at three points. Besides these, one palm had the inoculum from Tumkur bound by wire on to two roots near the surface of the ground, after wounding by the removal of an outer slice. The culture pieces were two weeks old.

In the case of the palm to which the inoculum had been tied by wire, the fungus was growing well on the cut surface of the root at the end of six days. Further examination was made after five months. Both the roots had been exposed by the irrigation water. The inoculum had disappeared from one root, but the root itself was dry and friable. Its base was discolored the discoloration proceeding to the interior. The tissues showed the fungus. The other root had come away with the inoculum. It was dry and the end of the root still attached to the tree was rotten.

Of the other palms inoculated in 1932, the crowns of three were yellow, and the basal leaves of one were hanging down.

The earheads thus infected were collected and a small quantity of seeds from each set was sown in pots during January 1933. The earheads have not developed any smut. The remaining seeds will be sown in pots and another set of seeds will be sown for infection this year.

11. Standing crops of ragi at Hebbal were found to have been infected rather severely with Piricularia. The neck region of the earheads were observed to have been affected with the result that many of the earheads had broken at their neck region rather prematurely. Presence of spores was observed in profusion on the spikelets. Seedlings of Kar ragi in a small plot near Devanhally were also infected with Piricularia. The leaf blades were affected seriously exhibiting the characteristic spots caused by the fungus.

12. Among the important diseases noticed were Pythium de-Baryanum on Chilli fruits, and Entomophthora aphidies on aphides infesting vegetables, Rhizoctonia on Soybeans, Fusarium on Cotton and Plantain.

13. *Publications.*—M. J. Narasimhan.—Cytological Investigations on the Spike disease of Sandal. (Phytopathology, Vol. 23. No. 2. 1933.)

S. V. Venkatarayan.—Downy Mildew of Grape vine. Journal of the Mysore Agricultural and Experimental Union. Vol. 13, No. 3.

W. W. Mayne, Narasimhan, M. J., and Srinivasan, K. H., Spraying of Coffee, in South India.

Mysore Coffee Experimental Station, Bull, 9, 1933.

M. J. NARASIMHAN,
Mycologist.

ANNUAL ADMINISTRATION REPORT OF THE ENTOMOLOGIST FOR THE YEAR 1932-33.

Summary.

Work in the Entomological Section continued on the same lines as in the past year and showed progress in all directions.

Extensive trials with coal tar distillates of different boiling points were made against the coffee stem-borer (Xyletrechus quadripes) and a 10% emulsion gave promising results. Investigations on an important pest of paddy, the stem-borer (Schoenobius incertellus) were continued and a study of its parasites is being made with a view to their use in the control of this pest. Spraying with lead arsenate was in great demand against Epilachna, a serious pest of potato in Bangalore and Kolar Districts and a total of 33 acres were sprayed with 213½ lbs. of the chemical during the year. Considerable work was done on the stem-borers of sugar-cane. Data were collected regarding the different species of borer moths and a study of their parasites was also made.

Further trials with indigenous fish poison plants were conducted. Mundulea suberosa and hongey oil resin soap received careful attention. A kerosene extract of the former proved toxic against the coffee green bug while hongey oil resin soap is found to be as effective as the imported fish oil resin soap.

Thirty-one colonies of bees were installed during the year, bringing the total in the State to 110 hives.

T. V. SUBRAMANIAM,
Offg. *Entomologist.*

(*a*) *Anaberoga of Cocoanut.*—A pure culture of the fungus causing this disease on cocoanut trees has been obtained. When grown on sterile pieces of the cocoanut trunk in bottles on a wad of moist cotton the fungus developed characteristic sphorophores.

(*b*) *Trunk-splitting disease of Arecanut.*—Inoculations were made on five trees in the Marthur Farm with a pure culture of the fungus, five days old from malt agar. An incision was made on the trunk, a little of the culture introduced and the tissue bound up. Two trees were wounded in the same manner but not inoculated to serve as check. The results are awaited.

3. *Experiments with different spray mixtures.*—Work was continued in co-operation with the Chemical Section on the comparative efficacy of spraying mixtures containing different spreaders. Two series of Coffee leaves of five treatments in each series, sprayed during the last season with plain Bordeaux, Casein Bordeaux, Resin Bordeaux, Linseed Bordeaux and Alum Bordeaux were received from the Coffee Experimental Station. Three hundred leaves in sets of 10 leaves for each treatment and altogether 1,500 leaves for five treatments were received in two series. These were cleaned, cut with a template and handed over to the Chemical Section for estimation of copper. Results of the analysis of both the series are complete. A third series of leaves sprayed during this season with five more different mixtures, *viz.*, Plain Burgundy, Resin Burgundy, Fish oil Resin Burgundy, Gingelly oil Bordeaux and Bouisol in addition to plain Bordeaux, Casein Bordeaux, Resin Bordeaux, Linseed Bordeaux and Alum Bordeaux were received for estimation of copper. These ten sets in triplicate, *i.e.*, 3,000 leaves in all were cleaned, cut and handed over to the Chemical Section for analysis of copper. The results of the analysis are embodied in a bulletin on "Spraying of Coffee" in South India.

4. *Black Rot of Coffee.*—Investigation on this disease was taken up by me on the Coffee Experimental Station, Balehonnur, and as a result, some new facts in its life history were brought to light. It was found that the germ tubes of the spores, fuse with each other, at a very early stage. Since the fungus has been hitherto considered to be entirely superficial on the surface of the Coffee leaf, no proper explanation has been given for the blackening of the leaf. It soon became clear that the fungus penetrates the leaf at a particular stage in its development, and from its peculiar cultural behaviour, that it secretes oxydase, which might explain the blackening of the leaf. A paper on this subject has been sent for publication in "Phytopathology". Spraying trials, made at Balehonnur with vegetable oil Bordeaux, showed that this disease was completely checked. Gingelly oil, Honge oil and Groundnut oil were tried.

5. *Spraying experiments against Mildew on Betel Vines.*—The following mixtures were tried at Magadi in two gardens where the vines were severely affected with Mildew. The trials were conducted twice on the same vines at an interval of three months.

1. Bordeaux mixture with Casein ½%.
2. Olite Sulphur, ½% and 1%.
3. Oil emulsions :—
   - (*a*) Honge soap +Gingelly oil 0·5%.
   - „ +Groundnut oil „
   - „ +Honge oil „
   - (*b*) Caster soap +Gingelly oil „
   - „ +Groundnut oil „
   - „ +Honge oil „
4. Bordeaux oil :—
   - (i) Bordeaux ½% +Gingelly oil 1%.
   - (ii) „ +Groundnut oil „
   - (iii) „ +Honge oil „

Twenty vines were sprayed in two gardens with ½% Bordeaux using Casein as spreader. The sprayed vines are decidedly better than the unsprayed ones. Seven vines were sprayed with ½% Olite sulphur and 14 vines with 1%. The dust was thoroughly mixed in water. The mixture in 1% strength appears to be better than ½% in controlling the disease. The three different oil emulsions with two different soaps which were kindly supplied by the Government Soap Factory were separately tried on one vine each as well as the three different oil Bordeaux mixtures. These trials are promising since the old leaves on the sprayed vines do not show the disease. Fresh leaves which were put forth after the spraying showed slight infection of the disease which was comparatively less than the unsprayed vines. Since each of these different mixtures was tried

on only one vine and since the leaves from the sprayed vines are being periodically removed by the gardener for sale nothing definite can be said as regards to the comparative efficacy of the different mixtures. It is proposed to try the same mixture against mildew on crops like peas, etc., during this season.

6. *Spraying against Alternaria disease of Potato.*—Spraying against this disease has not become as popular as it was expected. This is partly due to the fact that the potato cultivators have not seriously realised as yet the loss caused by the disease. Attempts are being made to create a greater demand for spraying from the cultivators. About ten plots round about Bangalore, Chikballapur and Ramakrishnapur were sprayed with ½% Bordeaux with Casein as spreader. Though the sprayed crops came up well as compared with the unsprayed ones, they are not entirely free from the disease. Results of yield taken from two fields at Ramakrishnapur gave an increase of lbs. 20 per gunta in the sprayed plots. The crop in these fields was sprayed with ½% Bordeaux twice, once when the crop was about 30 days old and the second a month later leaving the alternate plots unsprayed as checks.

Spraying with Calcium arsenate at the rate of 1 lb. in 50 gallons of water appears to be promising. A preliminary trial was taken up at Ramakrishnapur and in two villages near Chikballapur with the result that it was found that the disease was checked. It is proposed to try the Arsenate spraying on a larger scale since it acts both as an insecticide and fungicide.

7. *Bacterial disease of Betel Vine.*—This disease which is observed to be of common occurrence in betel vine gardens is characterised by black spots on the leaves and vines. The spots enlarge on the leaves and the affected vines break easily at the nodes. The bacteria which is found to be associated with Gloeosporium has been isolated from the spots on leaves. Inoculations of the bacteria from culture into healthy leaves have not been successful in producing the characteristic spots. Isolation of the organism is being repeated.

8. *The New Apple disease.*—This new disease on Apple trees noticed last year seems to be spreading. It is marked by a dark exudate from the stem, sometimes from cankers. The leaves are unaffected in the early stages, but dry up later on. The bark remains healthy but the heartwood shows a brown discolouration. Infection probably takes place through broken twigs or through the shimp of the stock remaining after budding has been done. Affected trees later die.

The pure culture of the fungus was transferred to sterile pieces of Apple stem in bottles on a wad of moist cotton. The fungus grows rapidly and in five days humps were developed. In the course of about two months the humps grew bigger, and exudate was coming out of the tips and a little later holes were visible at the tip. The tips were hairy and of a greyish colour. A week later, the humps tore up and exposed inside them ridges almost resembling the gills of the Agaricaceæ. The fungus is under study. Fructifications similar to those obtained in the laboratory had been noticed by us previously on the field, but they were then mistaken to have been produced by a saprohytic fungus, gaining entry after the death of the tissues. A more careful search will be made for fructifications in Nature.

Cereal Diseases.

9. *Helminthosporium disease of Ragi.*—Work was continued with a view to get at the perfect stage of this fungus. The perfect stage was not obtained in cultures on Sachl's media, or on ragi straw. It was not observed on the naturally infected material both straw and grain kept in the laboratory for over a year. Neither storing the cultures for ten days in a refrigerator nor exposure to ultra violet rays for 10 to 15 seconds induced perithecial formation. The experiments are being continued.

10. *Ragi Smut.*—Flower infection experiments were conducted on the four susceptible varieties of Ragi H2, H22, H40 and Local Hullubele sown in pots during June 1932. The earheads were infected with smut spores in four sets on three consecutive days in each case during November 1932.

(1) The spores were dry dusted on earheads before the flowers had opened.

(2) Dry dusting was done just after a few of the flower had opened.

(3) Spores were smeared with a camel hair brush with sterile water when the flowers had not opened.

(4) Spores were smeared with sterile water after a few flowers had opened.

ADMINISTRATION REPORT OF THE ENTOMOLOGIST FOR THE YEAR 1932-33.

1. *Charge.*—I continued to be in charge of the Section during the year under report.

2. *Staff.*—Mr. B. Krishnamurti, B.Sc., Senior Assistant Entomologist (*s.p.t.*) was on privilege leave for one month from 9th May 1933 to 8th June 1933.

3. *Tours.*—I was on tour for 100 days visiting various estates, farms and different places in the State where from pests were reported and the Senior Assistant was on tour for 120 days during the year under report.

4. *Pests and Enquiries.*—One hundred and twenty-five enquiries were received during the year from Agricultural Inspectors, Farm Managers and cultivators from different parts of the State *re* remedial measures against insect pests. The most important pest dealt with was the paddy case worm in a large tract of paddy in the newly opened paddy area under the channel in the French-Rocks Sub-Division. Kerosening the water in the plots and disturbing the plants, thus dislodging the worms rendered the plots completely free from the pest.

Most of the enquiries for remedial measures were of a minor nature and were dealt with by correspondence.

Special Investigations and Demonstrations.

5. (1) *Avarepod Borer.*—Assisted demonstration against this pest was conducted in 59 different villages in the State mostly in Bangalore, Mysore, Kolar and Tumkur Districts. One hundred and twenty-seven and one-fourth acres were treated on the whole at a cost of Rs. 99-2-0. The net profit per acre due to the treatment is found to vary *from* 13 annas *to* 15 annas. (*Vide* Statement I—appended.)

The control of the pest by simpler methods than the one in vogue now is being investigated. Attraction experiments with essences of various fruits, molasses, etc., failed to attract the moths. Repellent sprays were tried without any success.

A very dilute spray of bleaching powder in water was noticed to have a slight repellent action on the egg laying by the moths. It is also found to have some ovicidal action.

Large scale experiments will be carried out next season.

(2) *Red Headed Kamblihula.*—(Amsacta albistriga Wlk.) For eight years the work has been carried out systematically in the Kolar District and the pest was found to be in a very mild form only in two villages close to Kolar Town. A total of 350 moths was collected. In the previous year the number of places taken up for work was six and the moths collected were 12,912 and about seven lakhs of caterpillars were caught and destroyed.

(3) *Black Headed Kamblihula.*—(Diacrisia obliqua Wlk.). This used to be a fairly serious pest formerly in the Mysore District in the cold season. A severe outbreak of the pest occurred in a number of villages in the French-Rocks Sub-Division this year early in January, but the report about it was received here late and not much help could be rendered. The insects were noticed in some numbers round about Bangalore doing serious damage to a few potato plots, vegetables, fruit trees, etc. Advice and help was given to control the pest wherever possible.

(4) *Coffee Borer.*—(Xylotrechus quadripes, Chevr.). Experiments against the Coffee Borer with various washes were continued this year also to find out the most suitable wash with the maximum penetration and larvicidal effect. As Bhadravati wood tar distillate emulsions could not be had, coal tar distillates of higher and lower boiling points, *viz.*, 280°c–360°c and 180°c–230°c were got down from Calcutta. Emulsions were made out of these by means of ordinary resin wash in the Laboratory (not a stable

emulsion). A 10% strength of the higher boiling point tar emulsion gave a 30% mortality of the larvæ in the tunnels against 25% with the lower boiling point emulsion. A properly made stable emulsion will, it is hoped be as effective as the Bhadravati emulsion. Dr. Narayan, Bio-Chemist is making emulsions of the distillate with some of the good emulsifiers and it is hoped to treat a large area of coffee with this in the coming season.

Bhadravati Emulsion.—Out of the old stock on hand, 700 coffee stems were washed with a 10% strength. Other washes tried were proprietary materials like Pyrect, Sulfocide and Nicotine sulphate and these were found to have no penetrating or larvicidal effect.

Gas-house tar, Sulphur incorporated in Kerosene emulsion, Sodium arsenite in Kerosene emulsion and Bhadravati emulsion were tested, of which Sodium arsenite in the emulsions gave 30% and 60% larval mortality, but was followed by a discoloration of the green tissues of the bark. The other washes were not found to be effective.

Phenyle diluted with eight times water gave 20% larval mortality but slight scorching effect on the green bark tissue was noticed.

Sulphur (flowers) dusting as a deterrant against egg laying by the beetles was tried in about an acre of coffee.

The results of the various treatments are awaited.

In the previous years 1930-31, 1931-32 a 10% Bhadravati emulsion wash gave a reduction of two-thirds in the number of borer trees pulled out in the treated area as compared with the check.

Epilachna Beetle Pest on Potato.—There was an outbreak of the pest on potato in Bangalore and Chikballapur areas in the beginning of the year. As the spraying demonstrations against the pest last year was on a very small scale, a large scale demonstration was made in Devanhalli and the result was that in sprayed areas the crop obtained was 3 to 7 times more per acre than in the unsprayed areas.

There was a very severe and unusual outbreak of the pest on the Summer crop and as a result of the previous demonstration a very large number of applications for spraying was received and most of the growers in whose plots demonstration had been done last year were willing to pay for the chemical. Sixty-seven lbs. of chemical were purchased by these men and help was rendered to these and to other applicants who wanted free demonstration. On the whole, in nine taluks in the two Districts of Kolar and Bangalore, 85 areas ranging from 5 guntas to 3 acres in extent were sprayed, making a total of 33 acres and the chemical used was 213½ lbs. In Devanhalli alone about half the above acreage was sprayed (Statement II—appended).

Jola Grasshopper.—(Colemania sphenarioides, Boliv.).—In the village Hosamalige near Chitaldrug, where the pest occurred, remedial measures were adopted this year also. In the following villages, *viz.*, Dyamavanahalli and Ballekatte around Chitaldrug the pest was found in a very mild form and help was rendered in keeping down the pest.

Mango Hopper.—(Idiocerus, 3 species.).—Mango blossoming has been very poor this year and no large scale spraying could be undertaken. In the mango garden attached to the Ramakrishnapur Agricultural School, a few trees were in blossom with bad hopper attack. Spraying with honge oil resin soap was tried and it was found as effective as the fish-oil resin soap. The help of the Agricultural School students was taken in the spraying work.

Paddy Stem Borer.—(Schoenobius incertellus, Wlk.).—Investigations are being made in the Hebbal Farm to find out the seriousness of the pest or otherwise, season by season, alternative hosts if any and effect of light traps in the reduction of the pest.

From a study of the moths obtained in the light traps kept throughout the rainy season and summer crop, it has been found that there are two main generations of moths emerging during the growth of the summer paddy, *viz.*, February—March, soon after transplantation and again in May—June, at about the time the ear heads are formed. The attack at this time is found to produce empty ear heads. The maximum number of moths was obtained soon after transplantation of the rainy season crop, *i.e.*, during August—September and in May—June, before the harvest of the summer crop. In the earlier stages of the growth of the crop the attack is not apparent due to the profuse tillering. Eight hundred and fifty-three moths (492 males and 361 females) were

caught in the light trap during the growth of the rainy season crop and 1,000 moths (494 males and 506 females) during the summer season crop.

The possibility of reducing the pest to a minimum in the nursery beds is being investigated. As a preliminary to the introduction of egg-parasites (Trichogramma) bred in the Laboratory, study of the three natural egg-parasites are being made ; study of the two larval parasites (Braconids) are also being made.

In addition to Schoenobius, another borer Sesamia sp. is also found in small numbers boring into paddy stems, but this has not been found to be serious.

Rhinoceros Beetle.—(Oryctes rhinoceros, Linn). From the weekly records of catches of beetles in the cocoanut area in the Babbur Farm from 1929 to 1933, it is noticed that the daily catch of beetles averages 8 per day (roughly). There appears to be permanent breeding grounds in or round about the Farm where beetles breed continuously and attempts are being made to locate and destroy the insects in these places.

All stages of the beetles were found in large numbers breeding on fermenting megass near the jaggory house, a furlong away from the cocoanut garden. With the idea of trapping the early stages of beetles a number of pits were made adjacent to the garden and these were filled with leaf mould, decaying vegetable matter, cattle dung, etc., and it was found that cattle dung had the greatest attraction for the beetles and the largest number of grubs were obtained in this.

The possibility of reducing the beetles by providing breeding places close to the cocoanut area and systematically destroying the grubs, etc., is being investigated.

Sugar-cane Borer.—(Argyria stictieraspis, Hmp.). This species of borer is the most serious of all the borers of sugar-cane. The white-borer (Scirpophaga sp.) is found to be in greater numbers in the sugar-cane areas of Hiriyur and species of Argyria are very much less there.

In the sugar-cane areas of the Babbur Farm the white borer is found to be eight times more common than the other borer, and the egg masses of both are parasitised by two kinds of wasps, Trichogramma and a Sceleonid, Phanurus benificiens, Zhent. The white borer eggs are preferred by the latter. No reliable results could be obtained by the release of 14,000 Trichogramma parasites last year.

This year a preliminary study of the natural parasitisation of the egg masses month by month was made at Babbur.

To estimate the amount of damage by both the borers on the basis of crop yield the operations of hand-picking of the egg-masses and trash-heap method of collecting the moths were done in a ¾ acre plot. Two hundred and sixty-five moths of the borers were collected by Trash heap method of which 114 were Argyria; 894 white borer egg masses were hand-picked. As a result, the dead hearts in the treated area were 484 as against 1,035 in the check.

Early planted canes are found to be more liable to borer attack than the later planted canes in Babbur, the dead hearts found in a plot in the former were 313 as against 197 in the latter.

As the borers in sugar-cane do not appear to be regular visitants in pest from year after year in the sugar-cane areas, the control measures with Trichogramma parasites bred in the Laboratory could not be tried in one area continuously for two or three years so as to arrive at definite conclusions.

No assisted demonstration of the Trash heap method against the sugar-cane borer was done anywhere in the Divisions, but the sugar-cane growers are advised by the Divisional Officers and Agricultural Inspectors to take to this remedy.

Store Pests.—The mercury tin amalgam tried against *Bruchids* on stored grains was not found to be effective in keeping down the pest on stored grains kept in basket bins.

Mundulea suberosa root bark powder spread very thinly over the grain in basket bins, kept the grains free from Bruchid attack. All the insects coming to the surface from infested grains are killed and no further breeding takes place. The advantages in this method over the sand method advocated by the Department till now are that there is no sand to get mixed with the grains particularly when the latter are intended for consumption, and no live insects escape.

Lantana Seed Fly.—(Agromyza lantanæ, Frogg.) A consignment of infected lantana fruits was obtained from Hawaii. A dozen inactive, slightly mutilated flies emerged and thus no liberation of these flies was made.

Vegetable Fish Poisons as Insecticides.—Experiments are being continued with Mundulea suberosa stem bark as a water extract, kerosene extract and as a powder.

Water Extract.—Insetad of the usual method of soaking the powder in water for about 12 hours and decanting the liquid and using it against insects with soap, the Bio-Chemist's suggestion of filtering the liquid through a filter paper was adopted. It is found that this filterate at a 5% strength killed 95% green scale of coffee in about six days' time. The filterate was not so very effective when the powder was soaked for over 12 hours.

Kerosene Extract.—A 10% kerosene extract made into an emulsion and this diluted to 50 times with water (·12%) was tried against the coffee green bug and more than 75% of the insects were found killed in three days time. No mortality occurred in the check, where kerosene emulsion alone was tried at this strength.

Further, large scale trials against the green scale of coffee will be tried next summer.

Honge Oil Resin Soap.—This soap was got made in the Government Soap Factory according to the specification given by the Bio-Chemist of the Department. Various field trials were made with this against Mango hoppers and aphids on cabbage. It is found to be as effective as the Fish oil resin soap that is being imported from the West Coast and has the advantage of not having the fishy smell. The cost is only as much as the fish oil resin soap.

Trials against the green bug and brown bug on coffee on a small scale were found to be satisfactory. Field scale trials against these will be made in summer next

Of all the vegetable fish poisons so far tried, Mundulea suberosa being more easily available in large quantities than the others, it is taken up for exhaustive study. As the toxicity of Mundulea suberosa plant obtained at different periods and from different places appears to vary, one-fourth acre of land in Hebbal Farm has been planted out to study this variation.

Custard Apple seed powder has also been found to have very good toxic properties. The seed powder and a water infusion made out of the leaves of the plants are being tested for their insecticidal value.

(6) *Apiculture.*—Thirty-one fresh colonies of bees are working making a total of 110 colonies in the State. In the Agricultural Schools, bees in improved hives are kept for instruction to the students.

Ten improved hives with colonies of bees have been very satisfactorily working at Babbur Farm. As Hiriyur is found to be a very suitable centre for Apiculture due to its large areas of cocoanuts and plantain, Babbur Farm is made a centre from which it is hoped to distribute hives to the surrounding villages. It is also programmed to make Dodballapur, Chikmagalur and Koppa as centres and thereby interest the village panchayats of a few villages in above areas in Bee-keeping.

The demand for colonies of bees in improved hives is steadily increasing. There is a demand now for 50 colonies of bees in improved hives, but owing to the very limited staff, it has not been possible to meet the same. The colonies are being supplied as far as possible.

Training in Bee-keeping was given to three men, one from the Mysore Palace and two from Cleveland Town Municipal Boys' School.

(7) *Fumigation and Issue of Pest Free Certificate.*—Three consignments of coffee seeds received from (1) Mr. G. V. R. Frend, Kuridikhan Estate, Sangameswarapet, on 16th February 1933, (2) Mr. K. H. Srinivasan, Assistant Director of Agriculture, Chikmagalur, on 22nd March 1933, and 3rd May 1933 to be sent out to foreign countries were fumigated with turpentine and pest free certificates were issued.

Correspondence.—In addition to a lot of work disposed of orally and in unofficial notes, 1,070 letters were received and 1,042 letters were sent out during the year.

Papers Published.—A circular on The Potato Beetle (A serious pest of the potato crop), was published during the year. Circular No. 49.

Conclusion.—I desire to acknowledge with thanks the hearty co-operation of all the members of the staff who were associated with me in carrying out the work of this Section during the year.

BANGALORE,
19th October 1933.
Agri.

T. V. SUBRAMANIAM,
Offg. *Entomologist.*
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APPENDIX I.

Consolidated statement of Avare pod borer work done under the Assisted Demonstration Scheme during the year 1932-33.

No.	Range	No. of villages	Total acreage	Cost of treatment per acre	Total cost	Yield per acre	
						Treated	Check
			A. G.	Rs. a. p.	Rs. a. p.		
1	Mysore	1	8 0	1 0 0	8 0 0	140 Srs. ble.	104 Srs.
2	T.-Narsipur	6	26 0	Statistics	not availa	163 Srs.	
3	Bangalore	14	22 9	1 4 0	25 4 0	Profit of	126 Srs.
4	Do by Entomology Section.	5	16 10	1 6 7	22 15 0	0 15 9 per acre.	
5	Dodballapur	3	3 0	Free work		176 Srs.	94½ Srs.
6	Magadi	8	10 0	0 15 2	9 8 0	64 Srs.	48 Srs.
7	Tumkur	1	6 0	0 12 0	4 8 0	Results	not given
8	Kunigal	6	8 30	0 12 0	6 9 0	Do	
9	Madhugiri	6	6 0	0 12 0	4 8 0	Profit of 2-13-0	
10	Tiptur	2	2 1	0 14 0	1 12 0	per acre.	30 Srs.
11	Kolar	3	6 0	0 12 4	4 10 0	60 Srs.	..
12	Chintamani	4	13 0	0 14 2	11 8 0	..	..
	Total ..	59	127 10	0 13 3	99 2 0	..	

Remarks.—Average net profit per acre in money value ranges from Re. 0-13-7 to Re. 0-15-9.

APPENDIX II.

Consolidated statement of Epilachna spraying during 1932-33.

No.	Taluk	Total No. of areas sprayed	Total acreage	Quantity of chemical used	Remarks
	Bangalore District.				
			A. G.	Lb. Oz.	
1	Bangalore	13	3 17	16 12	Free Demonstration.
2	Nelamangala	5	1 38	12 0	Do
3	Anekal	6	3 05	17 0	13 lbs. do 4 lbs. sold at Re. 1-2-0 per pound.
4	Hoskote	5	2 10	11 8	Free Demonstration.
5	Devanhalli	43	16 34	134 8	75 lbs. do 59½ lbs. sold.
	Kolar District.				
6	Chikballapur	7	3 1	10 2	Free Demonstration.
7	Bagepalli	1	0 10	1 0	Do
8	Malur	2	0 9	1 4	Do
9	Sidlaghatta	3	2 0	9 8	6 lbs. do 3½ lbs. sold.
	Total ..	85	33 4	213 10	

	Lbs.	Oz.
Total free demonstration	146	10
Total chemical sold	67	0
Total ..	213	10

SUMMARY OF THE ANNUAL REPORT OF THE ENGINEERING SECTION FOR THE YEAR 1932-33.

The strength of the section remained the same as in the last year. In addition to the work at headquarters, the staff was employed in erection of machinery, repairs to machinery and supervision of buildings outside Bangalore. The work in the section has been increasing and there is a strong need for increase of staff.

2. Four sets of trials have been conducted of plough and plough shares on the Hebbal Farm and the Irwin Canal Farm. The Hindustan plough and the Cooper No. "26" were continued in trial on the Hebbal Farm. Plough shares of different makes were tested on the Irwin Canal Farm. A Eureka ploguh and two cultivators of indegenous manufacture were tested on the Hebbal Farm. Two light bar-pointed ploughs of Cooper make were tried on the Hebbal Farm. Details about their performance and the results are given in the detailed report.

3. The new seed drill tried last year was further improved and given a trial.

4. The honey extractor designed last year at a cost of Rs. 14 was further improved with a view to reduce the cost to Rs. 6. One has been given to the Entomologist for trial.

5. Sugar-cane power mills, power attachment to the bullock mills and bullock mills were demonstrated and tested at the exhibition grounds.

The Chattanooga Power mill on the Babbur Farm did not function correctly and the working on the Farm was done through the old Massey Mill. This machine is 15 years old and gives lower extraction. It would be uneconomical to work it any more.

6. The chaff cutter on the Hebbal Farm was run through electric power. A 12 H.P. Petter Engine was fitted to run the chaff cutter on the Cattle Breeding Station. A chaff cutter was worked in a private estate through departmental agency.

7. The 15—30 H.P. Tractor was transferred from the Cattle Breeding Station to the Mandya Farms where the major extent of Kodihalli, Malligere and Satnur Farms were ploughed.

8. The Hebbal workshop was improved by fitting transmission shafting for power drive of machines. Structural steel work for buildings, jeggory boiling outfits, indegenous implements were manufactured. The usual maintenance of repairs of machinery were attended to. Practical instructions in carpentry and smithy were given every week to students of the Hebbal Agricultural School.

9. A two-way connection was designed for the power sprayers. Two thousand leather washers at a cheaper cost were made for the Mycologist.

10. Plans and estimates to the value of Rs. 28,000 were prepared and an outlay of Rs. 7,620 was incurred on building works.

11. Four estates were visited at Arkalgud, Hoskote, Anekal and Binur. The Exhibition arrangements were attended to. Lectures covering a period of 24 hours per week were given for the Hebbal Agricultural School.

M. G. SINGARACHAR,
Agricultural Engineer.

REPORT OF WORK DONE IN THE AGRICULTURAL ENGINEERING SECTION DURING THE YEAR 1932-33.

The work of the section was conducted with the same strength of staff, part of which was continued temporarily. The establishment of the sugar-cane farms added work to the section. Proposals for increasing the strength of the staff are before the Government. It is hoped that they will sanction the needed additional staff and also consider about the necessity for making the section fully permanent.

I was on tour for 70 days, the main work being supervision of building works and the machinery on the Government Farms. The following list indicates the period the staff was engaged on outside duty.

Assistant Agricultural Engineer	11 days.
Mechanic	19 „
Assistant Mechanic	31 „
Engine Driver	19 „
Carpenter	8 „
Smith	120 „

During these periods, the men were engaged in running machine outfits, repairing machinery and erection of iron work for buildings on Government farms, and private holdings. The Lorry driver's services were lent to the Sugar cane farms at Mandya from November 1932 for working the Departmental tractor.

The trials of the "Hindustan" plough of the Cattanooga works, and the No. 26 plough of Cooper Engineering Works, were continued on the Hebbal Farm with the object of testing the full life of the shares. These being of the slip point type, slip points of the respective makers were renewed as many times as the shares could be worked with till they were rejected. It was noticed that the Hindustan plough used two points and ploughed 4·6 acres and the No. 26 plough used three points of which one broke, and ploughed 4·159 acres. It may fairly be remarked that the Hindustan plough is better than the other as regards material, weight and draft. The results of the tests are shown tabulated at the end of the report.

It was proposed to coat a hard alloy called "Stellite" to the wearing parts of a plough with an idea to prolong their life. Two stellited shares were accordingly got through the Industries Department and tried on the Irwin Canal Farm, alongside a K. M. share and an imported share received from the Central Industrial Workshop. At the same time, two K. M. Pattern shares one of which was chilled and the other of a better grade of steel and supplied by Cooper Engineering Works were tried. The report of the Superintendent, indicates that the imported shares wear longer than the Cooper products and that stelliting is not advantageous. A statement showing the wear of the shares is appended to the report.

One plough of the Eureka pattern priced at Rs. 10 and two K. M. type cultivators, one of six tynes priced at Rs. 10 and the other of four tynes priced at Rs. 6 were sent from Hassan as being manufactured by Chenniah, a mechanic of the locality. The cultivators were found to be good in work and are worth being recommended for use. The plough did fair performance and it is possible to improve it to the standard of the Eureka plough. It should also be possible to make and sell them at a cheaper cost.

Two light bar pointed ploughs priced at Rs. 2-8-0 each without the beam, were received from the Cooper Engineering Works and tried on the Hebbal Farm. The draft was no doubt light being one cwt. but the furrow was shallow being 2¼" deep and 4" wide. There does not seem to be a chance of substituting these for the Eureka or the Meston ploughs unless they are improved to plough a little deeper.

Reports are being received periodically from the several Inspectors about the merits of the K. M. ploughs and the K. M. pattern ploughs of the Central Industrial Workshop, in general use among the ryots. It is agreed by a majority that the K. M. plough is lighter in draft and of less weight. But the complaint is universal about

the quicker wear of the share. This is to show that the important work lies in the concentration of effort on the improvement of the quality of material put into the share.

The plots put under seed drill trials were kept under crop to study the comparative yields. The results do not show much appreciation in yields from the plot put under the improved drill. As the reason for this may lie in certain imperfections in the drill, trials are conducted this year by making certain new adjustments in the drill. Two more have been made, of which one is sent to the Irwin Canal Farm and the other to the Babbur Farm, for a trial.

Through the help of the Department, Bee-keeping has been started in a number of places. Extraction of honey through cheap means will go a long way to popularise the industry. Last year, a honey extractor worth Rs. 14 was designed to replace the costly imported extractor. Efforts were made during the year to improve the design with a view to reduce the cost further. An extractor costing Rs. 6 was made and given to the Entomologist for a test.

Bullock cane mills of Kirloskar Brothers and Cooper Engineering works were given short duration trials at the Mysore Exhibition. Three roller mills of Messrs. Massey's (1930) Ltd., and of Kirloskar Brothers and also power attachments of the Kirloskar make were worked at the Exhibition grounds. The figures of the trials are given at the end of the report.

The Chattanooga power mill purchased for the Babbur Farm and found to be unsatisfactory in work was as inefficient as before in spite of the efforts of the suppliers to correct the defects. The Cane milling of the Babbur Farm was therefore done through the old Massey mill. About 240 tons of cane were crushed in a period of 41 days of $5\frac{1}{2}$ average daily working hours, the extraction being 55% on the thin canes and 58% on the thick canes. The outfit is 15 years old and the extraction is very low. If cane cultivation on this scale is proposed to be a permanent feature on the farm, it would be a great saving to have a new milling set.

The chaff cutter on the Hebbal Farm was worked through electric power this year for the first time. It was lent to Mr. Narahari Rao, landholder, Honnur, Bangalore Taluk for a short period. A 10 H.P. electric motor could turn out $1\frac{1}{2}$ tons of fodder per hour with a consumption of $1\frac{1}{2}$ units of electric energy at a cost of 0-1-6.

A Petter's engine of 12 H.P. was purchased and fitted on the Cattle Breeding Station to work the chaff cutter.

The Mc. Carmic Tractor 15-30 H.P. and the ploughing outfit were sent from the Cattle Breeding Station to Mandya where they were worked to plough about 600 acres of land on the three sugarcane farms. The tractor disc harrow was repaired and transferred from the Babbur Farm to the Mandya farms. One Oliver Tractor plough was lent to the grass farm lands of the State Lancers, and 41 acres of land have been ploughed up till now. The Departmental Fordson tractor was sent to the estate of Mr. N. Sampthaiengar, retired Agricultural Chemist of the Department, where $18\frac{3}{4}$ acres of virgin land were broken up.

The electrical pumping outfit of the Paddy Breeding Station was transferred from the Devaroy Channel Bank to a low spot where a house was built, the outfit installed and an overhead tank erected with the necessary pipe connections. The pipe laying work for the Cattle Breeding Station was completed and water supply given to all the residences and the Cattle stalls. The pumping outfits in the Cattle Breeding Station, Ramakrishna Krishi Sala, and the Marthur Farm were inspected to remedy machine troubles. The Electric pumping set near the dry area well was worked throughout the year in irrigating the seasonal crops of the Botanical section and supplying water off and on to the Hostel. An electric pumping outfit was newly fitted in the Chemical laboratory with delivery led on to an overhead tank, for supplying water to laboratory workers.

The Hebbal Workshop has been improved by adding line shafting with a view to use electric power for driving machines. The hand operated drill and the lathe are being modified to be run by power. A wood turning lathe was purchased for turning seed cups, handles and other products. The country implements and small articles required for the farms, the Serum Institute and other sections of the Department were made at the Hebbal workshop. The worksnop staff was also employed in the erection of steel structures, wire fencing and fitting of machinery in outside places.

The important products made were :—

1. Roof trusses for the store house on the Irwin Canal Farm at Mandya.
2. Roof trusses for the Kodihalli Sugar-cane Farm at Mandya.
3. Roof trusses for the Implement and stores of the Ramakrishna Krishi Sala.
4. Roof trusses for the extended implement shed at Hunsur.
5. A breeding cage for the Kar Ragi Breeding Station at Hunsur.
6. Borehole latrine enclosures for the Hebbal Hostel.
7. Iron fixtures for the Sheep Farm buildings at Yellachihalli.
8. Fifty feed troughs for the Serum Institute.
9. Twelve sets of jaggory furnace equipment.
10. Two fumigating boxes and a moth breeding cage for the Entomological Section.

Fifteen verity ploughs were fitted up by supplying the parts required to assemble the incomplete set kept in the Implement Depot. Two cart weigh bridges were erected, one at the Irwin Canal Farm and the other at the Serum Institute.

As required by the Assistant Director of Agriculture, Chikmagalur, a two-way connection for the power sprayer was designed, and on approval, a number of them were supplied. They are being made locally at a cheap price. As suggested by the Mycologist, the manufacture of leather washers for hand sprayers was attempted with success and 2,000 washers are being made and supplied at a cheaper cost.

In addition to the above, the management of machinery on the Hebbal Farm and the holding of weekly practical classes in smithy and carpentry were part of the duties of the workshop staff. The work in that section has been increasing and there is a reasonable need to expand it.

During the year, 40 building plans and estimates valued approximately at Rs. 28,000 were prepared. The outlay on works sanctioned and carried out was Rs. 7,620. The petty works of all the sections and the annual repairs for buildings on the several farms were attended to. Plans and estimates for the construction of buildings on the sugar-cane farms near Mandya have been submitted.

The estate of Mr. Vasudeva Sastry, Gobli, Arkalgud Taluk was visited in connection with the submission of a report about the suitability of the pumping plant supplied by the Industries Department. Three other estates were visited for engineering advice at Hoskote, Anekal and Kadur, respectively. The improved jaggory furnace was in demand in a number of places in Tumkur and Kolar Districts and help was rendered wherever necessary.

The Exhibition arrangements were attended to as usual. His Highness the Nawab of Janjira visited the Hebbal Workshop for two days during which period, the work of the section was explained to him in detail.

The teaching in Agricultural Engineering was managed by the Assistant Engineer who was in addition put in charge of the Hebbal Workshop and supervision of building works on the Hebbal Farm.

M. G. SINGARACHAR,
Agricultural Engineer.

Trials of shares at the Irwin Canal Farm.

Kind of share	Weight of share before trial in grammes	Weight after trial in grammes	Area ploughed in acres	Wear in grammes	Remarks
Stellited share No. 1 ..	1,450	1,080	2.775	370	Worked side by side in a common field till shares worn out.
Stellited share No. 2 ..	1,440	1,100	2.775	340	
K. M. share (American) ..	1,049	1,001	2.38	48	Worked side by side in a common field and shares still fit for service.
K. M. share (C.I.W.) ..	1,166	1,122	2.38	44	
Cooper chilled share ..	1,130	960	2.475	170	Share completely worn.
Cooper improved steel share ..	1,090	900	3.775	190	Do

Trial of Ploughs.

Type of plough	Weight of plough	Draft in	Average furrow section	Draft in lbs. per s q.	Slip point No. 1	Slip point No. 2	Slip point No. 3	To be ploughed	Remarks
Cooper No. 26 ..	74 lbs.	2½ to 3 owts.	6″ × 8″	7 lbs.	1·669	1·326	1·164	4·159	2nd slip point broke in work and the third is still fit for use.
Hindustan plough ..	55 lbs.	1½ to 2 owts.	5″ × 7″	6·4 lbs.	1·514	3·06	64	4·574	Both the slip points were completely worn out.

Seed trials in plots of 66′ × 33′ or 2 guntas. H.22 ragi.

Type of drill	1st Series		2nd Series				Remarks
	Seed rate per acre	Yield in grain per acre	Yield in straw per acre	Seed rate per acre	Yield in grain per acre	Yield in straw per acre	
Country drill	7·7 seers	1,880 lbs.	10,000	7·7 seers	2,080 lbs.	9·200 lbs.	
New drill	6·6 ,,	1,520 ,,	7,800	7.2 ,,	2,100 ,,	8,000 ,,	Plot in the first series slightly damaged by rain.
K. M. Gururaja Rao's drill	2 ,,	1,920 ,,	9,400	2 ,,	1,900 ,,	8,000 ,,	

Sugar-cane mill trials at the Mysore Exhibition. H. M. 544 cane.

Type of Mill	Quantity in lbs.	Juice extraction in lbs.	Time taken in minutes	Cane crushed per hour	Percentage of extraction	Average No. of canes crushed per pound	Remarks
Massey Power Mill ..	500	356	15′	2,000 lbs.	71·2	6	Power used was 13 H. P.
Do do ..	451	319	12′	2,255 ,,	70·7	6	
Do do ..	250	185	6½′	2,308 ,,	74·00	8	
Kirloskar (Vasantha Power Mill).	250	181½	8½′	1,765 ,,	72·6	4	
Kirloskar Karamath (Power attachment).	250	177	13′	1,154 ,,	70·8	3	
Kirloskar Karamath (bullock Mill)	125	91	21′	357 ,,	72·8	2 to 3 canes.	
Cooper Bullock Mill ..	75	50	13′	346 ,,	66·7	2 to 3 canes.	Bullock driven.

REPORT OF WORK DONE IN THE SRI KRISHNARAJENDRA VYAVASAYA DHARMA PATASALA, CHIKKANAHALLI, FOR THE YEAR 1932-33.

1. *General Administration.*—Mr. M. B. Ranganatha Rao was in charge of the school till 13th December 1932, and as he fell ill, he was temporarily relieved by Mr. Bapu Shama Rao till 21st March 1933 and Mr. N. Srinivasamurthy, Agricultural Inspector, transferred from Tiptur Range, took charge of the school permanently on the 23rd March 1933.

2. *Rain-fall and Seasonal Conditions.*-A total rain-fall of 40·03 inches was received during the year as noted below :—

1.	July 1932	1.39"
2.	August 1932	7.95"
3.	September 1932	1.77"
4.	October „	13.37"
5.	November „	7.31"
6.	December „	..
7.	January 1933	..
8.	February „	0.07"
9.	March „	..
10.	April „	1.25"
11.	May „	6.08"
12.	June „	0.84"
	Total	40.03"

As the rain-fall was favourable this year, the crops were moderately good throughout.

3. *Number of Students.*—The total number of students who entered the school was 15 and they continued till the end of the year. They were getting as usual the Government scholarship of Rs. 12 each a month.

The number of students was made up of, according to district and communitywar, as follows :—

Districtwar—

Tumkur	6
Mysore	3
Bangalore	4
Kolar	2
Total	15

According to Communitywar.—

Vokkaligars	4
Tigala	1
Washerman	1
Lingayets	2
Naik	1
Mahratta	1
Adikarnatakas	2
Brahmins	3
Total	15

4. *Attendance.*—The total number of days in which classes were held was 248. The average number of days the students actually attended was 193 which comes to 78 per cent of the total number of working days. The fall in the average attendance is due to the fact that some of the students joined the Patasala late in August and September. Besides, some of them had to stop away for weeks together due to ill health.

5. *Health of Students.*—The health of the students was better in the beginning. After returning from Babbur Farm tour, many students fell ill due to Malaria and also seasonal conditions. The Sub-Assistant Surgeon, Sira, was visiting the School frequently and rendering medical aid. In the interest of the health of the students and the staff, it would be better if the Sub-Assistant Surgeon visits the school twice a week and teaches the students some lessons on first aid.

6. *Lands.*—Much of the land under Gowthamanakatte has been cleared off the date trees and the major portion was brought under cultivation. An area of 2 acres has been levelled and is being made ready for wet cultivation. If the water in the tank is mainly to feed the lands under our control, the water which stands in the tank may be helpful for cultivating about 2½ to 3 acres of wet lands attached to the School in the years of good rain-fall. The total area of the Farm attached to the Patasala is 39 acres and 8 guntas, of which 21 acres are now under cultivation.

The different types of varietal and manurial experiments were also conducted to give the students an idea of the recommendations made by the Department. Ensilage with 7,890 lbs. of different kinds of fodder was also prepared by the students. A portion in front of the school was fenced with barbed wire for the first time which was done by the students alone and they were shown the method of fencing of lands.

7. *Courses of Instruction.*—Instruction was imparted purely in Kannada and in accordance with the syllabus. The students were given practical instructions in the Veterinary Dispensary at Sira and also had a goat dissection class to study the different internal organs of the animals.

8. *Practical Work.*—This included all the Farm operations from start to finish. As the area attached to the School was extended, the students had to be given more field work than usual as they had to do and learn all the operations themselves.

In the Carpentry and Smithy classes, they prepared several articles required for the use of the Farm, such as cultivators (after the Kolar Mission make) mammaties, varvaries, sickles, etc. They were also engaged in putting up wire fencing, preparing some models of stools, tables and also country ploughs, shares and kuntes.

In addition to general Farm work they maintained a vegetable and a flower garden as usual.

9. *Sports and Reading Room.*—The students maintained a Sports Club and a Reading Room. They are subscribing for the following papers :—

1. Vrittantapatrike.
2. Viswakarnataka.
3. *Mysore Gazette.*
4. Journal of the Mysore Agricultural and Experimental Union.
5. Subhoda.
6. Tainadu.
7. Vokkaligara patrike, added at the end of the year.

In addition to the above, they are lent the Arthasadhaka Patrike got for the School and it is incumbent on every student to read news-papers to improve his general knowledge.

The students conducted daily prayers and weekly Bhajanas on every Saturdays.

The two hostels one for the Lingayet and the other for Brahmins were run as usual.

10. *Library.*—Eleven books were added to the Library during the year of report and the students are making use of the same freely.

11. *Excursions.*—As there was no Government grant for the excursion of students this year, they visited only Babbur Farm at their own expense. As the knowledge of the students would increase by actually observing the different agricultural operations carried on in the Estates and Farms, it is quite necessary that they should be given some financial help as was being done till now for their tours.

12. *School Day for the year* 1931-32.—The School Day for the year 1931-32 was held under the distinguished presidency of Mr. H. V. Ramasvami, M.A., B.L., Deputy Commissioner, Tumkur District, on 13th July 1932, and certificates and prizes were distributed to the successful students. Out of the 15 students, all except one passed the final examination held in the month of June 1932, three of whom, with distinction.

13. *Examination of* 1932-33.—The final examination for the year 1932-33 was conducted in June 1933 and all the 15 students passed, two of whom with distinction.

14. *School Day for the year* 1932-33.—The School Day for the year under report was conducted under the presidentship of Dr. Leslie C. Coleman, M.A., Ph.D., C.I.E., Director of Agriculture in Mysore, on 4th July 1933 when certificates and prizes were distributed to the students. Besides the Deputy Commissioner, Tumkur District, the President, Tumkur District Board and several other local officers of the Police and Revenue Departments also graced the occasion with their presence.

15. *Visitors.*—Mr. T. Abdul Khader, B.A., Deputy Commissioner, Tumkur District visited the Institution on the 13th May 1933 and evinced great interest in inspecting the School Farm and the students at work and was kind enough to promise help as far as possible in the extension work of the Institution.

16. *General.*—It is to be reported that the work of the Institution entails lot of clerical work, Farm supervisions, teaching, hostel management, etc. The need for clerical help is most urgent and it is an immediate necessity considering the volume and nature of accounts work and the increased responsibility attached to the Farm work, as the area has now increased, besides teaching work. I submit therefore that this long felt want might be taken up for immediate consideration and favourable orders.

S. DANIELL,
Assistant Director of Agriculture,
Tumkur Circle, Tumkur.

ANNUAL REPORT OF THE RAMAKRISHNA KRISHI SALA, RAMAKRISHNAPUR, ANEKAL TALUK, FOR THE YEAR 1932-33.

1. *Administration.*—It is under the administrative control of the Assistant Director of Agriculture, Mysore and is managed by the Head Master and his staff of Assistants. Further, it is under the general direction of the Director of Agriculture in Mysore, Bangalore, assisted by the Advisory Board which met five times during the year to consider details of the working of the School. In this connection we are sorry to lose the valuable services rendered by one of the members Mr. K. Lakshminaraniah, B.A., Retired Sub-Judge, Bangalore, whom the Providece, snatched away from us recently.

2. *Staff and Changes.*—Mr. K. Ramachandra Iyer was in-charge of the institution till about the middle of April 1933 when he was transferred to the Military Grass Farm and his place was taken up by Mr. H. Shankaranarayan, Agricultural Inspector, Mysore.

3. *Seasonal Conditions.*—There was a total rain-fall of 29·46 inches during the official year. This year, mungar rains were very unfavourable for Agricultural operations in consequence of which seeds could not be sown until about the third week of May 1933. Groundnut and Til crops suffered a good deal on account of uneven distribution of rain. Paddy suffered throughout its growing period to non-receipt of water to the tank.

Again 1933 mungar was not favourable for our purposes and there was not more than 5 inches of rainfall between the months of April and June 1933, that too being unevently distributed. As a result of this, Til crop in these parts is a total failure.

Rain-fall statement for three years.

Month.	1930-31	1931-32	1932-33
January	0.17	0.00	0.00
February	0.00	0.00	0.52
March	0.31	0.00	0.25
April	2.13	2.44	0.12
May	8.24	2.5	3.94
June	0.60	1.21	0.97
July	3.07	2.65	2.61
August	1.08	0.74	2.46
September	2.61	5.24	2.62
October	10.70	2.19	11.78
November	1.06	6.39	3.80
December	0.64	1.21	0.39
	30.60	24.12	29.46

4. *Selection of the Batch and re-opening of School.*—The Sala commenced its sessions as usual during the year on the 1st of July 1932 with 17 students on the roll. According to communities, there were 12 Brahmins, 1 Lingayet, 1 Rajput and 3 Vokkaligars: 5 students left the school before the middle of August 1932 for various causes and only 11 Brahmins and one Vokkaliga continued throughout the year. The students selected are classified Districtwar as detailed below :—

District.	No. Selected.	No. left.	No. continued.
Mysore	4	1	3
Bangalore	10	4	6
Kolar	2	..	2
Kadur	1.	..	1
	17	5	12

Examination and Results of Students.—The final Examination of students was held during the first and second weeks of June 1933 and the results are encouraging. Out

of 12 students that sat for the examination, 11 Students have come out successful, the 3 students that won the prizes are Messrs. H. Subba Rau, A. R. Visweswariah and Ramachandra Sastry who were given prizes as detailed below :—

Name.	Theory	Practice (Agriculture)
H. Subba Rao ..	Mysore Plough with chain (Pattern)	Mysore Plough with Chain (Pattern) I prize.
A. R. Viswesvariah ..	Abound book	C.I.W. Cultivator, II Prize.
Ramachandra Sastry ..	Union Journal. (Old copies of Kannada edition)	

The examiners were as follows :—

Messrs. M. Narayana Reddi, B.Sc., S. H. Bennur, L.Ag. — Agricultural Theory.
S. Daniell. L.Ag., N. Venkatasubbiah — Practice in Agriculture.

Certificates of pass and prizes were very kindly given away to the successful students by Dr. Leslie C. Coleman, C.I.E., M.A., Ph.D., the Director of Agriculture in Mysore, Bangalore, at the time of school day function on the 18th June 1933.

Selection of next batch of students for 1933-34, the batch of students was selected by the members of the Advisory Board and the number selected is calssified according to the district as detailed below :—

Districtwar.—

Mysore	4
Bangalore	9
Hassan	..
Kolar	2
Kadur	1
Tumkur	1
	17

According to Community.—

Brahmins	9
Lingayets	2
Vokkaligars	5
Weaver	1
	17

Total number of 17 students were admitted to the school and one left the Sala on account of domestic troubles.

5. *Instruction.*—The full course of instruction as per syllabus was gone through. Practical instruction in Agriculture on the School Farm was of such a nature that more attention was devoted to the practical side of handling all the Farm operations as the aim of the school is to turn out practical Agriculturists. In addition to the theoritical lectures given in the class, extension lectures were delivered by the staff of the scientific sections of the Agricultural Department in Botany, Mycology, Entomology and Chemistry. Lectures in Veterinary and first aid were arranged to be delievered by the Veterinary Inspector, Anekal, and the Sub-Assistant Surgeon for a period of three months during the year under report.

6. *Touring.*—Owing to lack of funds the usual excursion to the students was stopped but opportunities were taken to visit a few of the important estates and cattle fairs with a view to familiarise students about local conditions.

Estates Visited.—

(1) Mr. Subba Rau .. .. .. Anekal.
(2) Mr. B. K. Garuda Char .. .. Kyalasunahalli.

Cattle Fair.—

(1) Hennogara Jatra .. .. .. Anekal Taluk.

7. *Reading Room, Library and Sports.*— There are only two periodicals received for the use of the students namely, Arthasakada Partike, Prajamitra, Vakkaligaru and Vakkalathenevu of Dharwar, and the Vernacular Agricultural Journal of the Union. As regards sports, arrangements have been made for playing Volly Ball. There is no

separate play ground for this purpose and the open area in front of the school is being used for the same.

8. *Health of the Students.*—On an average, each student has put on an increased weight of about 6 to 10 pounds during his stay, in the school.

9. *Bhajane in Temple.*—(Moral Development). Punctually on every saturday in the evenings all students gather in the Temple for Bhajana.

10. *Hostel Management.*—As usual the management of the Hostel is entirely in the hands of the students and assistance of the Sala staff is taken whenever necessary, particularly in maintaining the accounts of Hostel. The Sala produce is chiefly being consumed by the students. Statement showing the expenditure incurred during the year by monthwar is attached (No.1).

11. *Carpentary and Smithy.*—With the hlep of the carpentary and smithy instructor, the students had enough of practice as that of last year in manufacturing Farm tools such as sickles, varvaries, plough shares, slip points construction of country chaff cutters etc. Opportunities in building construction work, specially in making door and window frames were availed of. fixing tyres for cart wheels repairing axil and the construction of picotas etc., were done. The following are articles manufactured by the students during the year.

(1) Benches	14
(2) Stools	12
(3) Chairs	5
(4) Table	1
(5) Ragi sieve	1

12. *Ensilage Making.*—To give practice in ensilage making to students, an old circular pit of about 5 feet in diametre and 8 feet in depth was filled in with about 2 tons of green Jola stacks cut into small pieces, in the month of August 1932 and the stuff was fed to milking and working animals in hot weather between the months of February and March 1933. The Live stock took to the stuff very eagerly. The students had enough of practice in preparing the ensilage.

13. *Live Stock.*—The present strength of live stock may be divided as noted below :—

Particulars.	No. at the beginning of the year.	No. added.	No. sold.	Balance.
She-Buffaloes	5	1	..	6
Small He-Buffaloes	7	..	4	3
Small She-buffaloes	4	..	..	4
Cows	4	..	1	3
She-calves	5	..	..	5
He-calves	4	..	..	4
Bullocks	11	2	2	11
Total	40	3	7	36

There were 40 heads of cattle on the Sala at the beginning of the year. One buffalo was received as stray cattle and one pair of bullocks was sent here from the Amrithmahal Department for training thus the total addition is 3 heads. Under sales of animals 2 Amrithmahal Bullocks were sold to Kodihalli Farm and 4 He-buffaloes and one cow were sold to Serum Institute as they were not useful to the Sala. Arrangements have been made for the supply of one Amrithmahal Breeding Bull which is expected to arrive in about a month's time. The strength of the working animals being insufficient in view of the varied nature of work on the Sala, the animals are overworked. As regards milking animals there are at present 3 cows and a buffalo milking in moderate quantities. The supply of curds ghee etc., are made use of. for the Hostel. (*Vide* statement attached No. II.)

14. *Spraying Work.*—Spraying was done effectively on potato crop against alternaria with the following results :—

(1) Sprayed	6 Guntas	Yield 303 lbs.
(2) Unsprayed	6 „	„ 280 „

Mango hoppers were distroying all the flowers in the mango grove and fish oilsoap solution was sprayed by the Entomological Section of the department in which the

students took active part and acquainted themselves with this particular operation. In addition to the above spraying was also undertaken by students against Aphis Scale insects and Sooty Mould. Kanoja nests were all destroyed.

15. *Crops.* (1) *Cultivation direct by the School.*—During the year under report the undermentioned crops were raised on the Sala Farm, *Viz.*, Sugar-cane, Potatoes, Paddy Plantains, Turmeric, Ginger, Onion, Irrigated Ragi, in wet and Garden areas, Vegetables such as Beans Raddish, Cucumber, Brinjals, Chillies etc., as irrigated crops. Dry crops—Ragi, Groundnut, Jola, Fodder crops, Thogari, Avere and caster crops.

The total area about 45 acres were cultivated during the year to raise the above mentioned crops. Soil being very poor and devoid of organic matter, the out-turn is less. Table 3 appended will give an idea about the various crops grown with their relative yield.

(2) *Cultivation by Tenants.*—Total area of about 74 acres of dry and 13 acres of wet and one acre of garden lands were cultivated by several tenants in Kithaganahalli, Kachanaikanahalli and Ramakrishnapur and yield shared by the Sala in various crops grown and noted in the table 3, appended to the report. The attention paid up by the tenants except by one or two who are living at the Sala premises is very unsatisfactory. Some feasible scheme may be founded to better the cultivation by the tenants.

(3) *Cultivation by the Colonists.*—There were two colonists working in the Sala and each colonist was in charge of 7 acres dry and 3 acres wet lands. They had grown various crops and table 3 will give an idea as to their yield and their relative value. These colonists were given all the facilities required for their cultivation and they were fed in the Hostel during their stay here. Out of the total realisation of crops valued at the market rate actual cost of cultivation and feeding charges were met. Each colonist was given a bonus of Rs. 25 towards the permanent improvement effected for the Sala by them.

16. *Orchards and Plantation.*—Training in growing fruit plants and raising nursery for growing Honge was one of the main items of work tackled year by year with a view to have a permanent income for the Sala. In the orchard the following plants are existing :—

(1) Guavas	12
(2) Oranges	23
(3) Pommegranets	26
(4) Lime	32
(5) Custard apple	9
(6) Figs	8
(7) Butter fruit plants	3
	113

In addition to the above Jack plants are also planted.

Sugar-cane Milling and Jaggory Boiling.—During the year sugar-cane was grown on about 1¼ acres consisting of the following varieties—*Viz.*, H. M. 320, 544, J33.A. H. M. 602, Local Pattapatti, H.M. 500 and 533. All these varieties were milled in the month of February last 1933 by the students themselves and jaggory was manufactured in Hebbal Begas furnace. Statement No. 4 will give details of yield of Jaggory obtained from each variety, from Several agencies as per statement enclosed.

17. *Temporary Mud Wells.*—Sources of irrigation mainly for sugar-cane crop were augmented by removing silt in general and deepening one of the wells. Another small well near the tank sluice was dug to supplement water to the crops as existing wells could not supply enough of water.

18. *Wire Fencing.*—Wire fencing was done on one end of the tank bund towards sugar-cane crop with a view to prevent tresspass of cattle and thus save damage to the crop.

19. *Mango Tope in Kachanaikanahalli.*—There are 153 Mango trees in the village and the area is not well protected with any fencing and as a result the plantation has become a common property of the villagers. If this plantation is well protected before doing any work with a view to improve condition of plant and yield, I am sure the desired effect is not far off to meet with.

20. *Cocoanut Plantation.*—Cocoanut plants are not well thriving owing to attack of Rhinocerous Beetle in large numbers inspite of proper precautions taken for the same.

Arrangements are being made to fill in the blanks, and further extending area under this. Nursery from good seed nuts from Babbur Farm will be got for the same.

21. *Permanent Improvements.*—(1) One rat proof Store was built on a permanent basis.

(2) The Inspector's and Fieldman's Quarters were provided with varandhas.

(3) One electric pump-shed was built near the students garden area for irrigation purposes.

(4) One bath room was constructed to create facilities for students to bathe.

(5) The School room was connected with the store room of Hostel into one lecture hall by removing the central wall.

22. *Collection of Manure.*—During the year 234 carts-load of cattle manure collected at Hennagara Jatra were carted and stocked in an open pit and during the same period 200 carts-load of manure have been stocked being the manure got every day on the Farm. Total quantity collected is 434 carts-load.

23. *Correspondence.*—

(1) Outward letters	1,202
(2) Inward letters	1,028

24. *Gift from the Donor.*—The Donor Mr. G. Venkata Ramaniah, Pleader, Bangalore, has again placed at the disposal of the Sala one stone oil-mill for which he deserves the thanks of the students and the staff.

25. *District Board Grant.*—Thanks to the District Board, Bangalore, who very kindly sanctioned, a sum of Rs. 500 towards the expenses of the Sala.

27. *Visitors.*—More than 100 visitors have come to see the working of the Sala, and among them the following distinguished ones may be mentioned.

(1) Members of the Advisory Board.
(2) Mr. C. V. Krishna Iyengar, Assistant Professor of Botany, Inter. College, Mysore.
(3) Mr. Narahari Ro, Landlord, Hennur, Bangalore District.
(4) Mr. G. Venkataramaniah, Pleader, Bangalore and Donor of the Institution.
(5) Mr. C. B. Shama Rao, Retired Amildar, Bangalore.
(6) Mr. C. B. Rama Rao, Bangalore.
(7) Mr. B. Srinivasa Iyengar, Jodidar, Anekal.

28. *Apiculture.*—This has been just taken up during the year as a bye-occupation for students of the school. In the course of about 8 months, 7 lbs. of pure honey was obtained and sold at Rupee one per pound.

29. *Conclusion.*—The existing staff is too small to cope with the work as the Sala activities have been increased on all sides and as a result, every individual is being overworked. The school itself will require one whole-time man for teaching and practical work and an Accounts clerk is quite essential for office.

30. *Financial Statement.*—Statement No. 5 enclosed shows the receipts and No. 6 shows the expenditure under budget grants.

S. H. BENNUR,
Assistant Director.

STATEMENT I.

Statement showing the Hostel expenditure during the year 1932-33 monthwar at Ramakrishna Krishi Sala.

Serial No.	Month	Amount	Number of Boarders	Remarks
		Rs. a. p.		
1	July	101 3 3	15	
2	August	93 11 7	15	
3	September	95 0 6	14	
4	October	64 6 7	15	
5	November	92 1 11	14	
6	December	75 0 0	14	
7	January	93 7 9	15	
8	February	86 0 6	15	
9	March	108 13 4	15	
10	April	57 7 3	11	
11	May	95 13 7	12	
12	June	65 14 4	12	
	Total ..	1,029 0 7	167	

STATEMENT II.

Statement showing details of Milk yield and other products obtained during the year 1932-33 and their disposal either by sale or issue to Hostel at Ramakrishna Krishi Sala.

No.	Month	Issues			Issues		
		Yield of milk	Hostel	Sale	Ghee obtained	Hostel	Sales
		Srs. Pavu	Srs. Pavu	Srs. Pavu	Lbs. ozs.	Lbs. ozs.	Lbs. ozs.
1	July	88 0	88 0	..	10 8	10 8	..
2	August	61 2	61 2	..	9 3	9 3	..
3	September	50 3	50 3	..	7 2	7 2	..
4	October	167 ¼	167 ¼	..	16 15	14 11	..
5	November	218 1¾	198 3¾	19 2½	26 5	20 6	..
6	December	203 2	171 1	33 1	22 13	16 11	11 1½
7	January	216 ¾	178 ¾	38 0	20 10	18 8	2 13
8	February	234 2	200 1	34 1	21 0	17 8	4 1
9	March	229 2½	198 2	31 ½	20 12	21 3	1 9
10	April	144 1	103 1	41 0	13 1	8 13½	4 3½
11	May	150 2½	113 2½	37 0	13 1	13 1	..
12	June	137 1	96 2	40 3	12 3½	7 0	..
	Total ..	1,901 2¾	1,627 2¾	274 0	193 9½	164 10½	23 12

Balance 5 lbs. 3 ozs.

STATEMENT III.

Statement showing the produce grown by the Tenants of Kachanaikanahalli and Kithaganahalli and their approximate value.

No.	Name of crop	Area	Quantity in seers	Approximate value	Remarks
	KACHNAIKANAHALLI.			Rs. a. p.	
1	Ragi	6 Acres ..	421½ ..	21 0 0	One-third share of the produce to the school in dry lands and half share in wet lands.
2	Togari	Akkadi ..	4 ..	0 5 0	
3	Avare	,, ..	10 ..	0 14 0	
4	Horsegram	1 Acre ..	12 ..	0 8 0	
				22 11 0	
	KITHAGANAHALLI.			(By tenants.)	
1	Ragi	6 Acres ..	645 Srs. ..	32 4 0	
2	Mustard	Akkadi ..	1 ,, ..	0 2 0	
3	Avare	,, ..	55 ,, ..	4 8 0	Do
4	Horsegram	1½ Acres	36 ,, ..	1 4 0	
5	Gingelly	2¼ ,, ..	89 ,, ..	9 0 0	
6	Paddy	10½ ,, ..	2,055 ,, ..	100 0 0	
7	Paddy straw		3 Cart-Loads ..	15 0 0	
				162 2 0	
	RAMAKRISHNA KRISHI SALA				
1	Gingelly	8 Acres ..	90½ Srs. ..	10 0 0	
2	Same	3½ ,, ..	72 ,, ..	3 0 0	
3	Groundnut	¼ ,, ..	54 ,, ..	3 0 0	
4	Ragi	43 ,, ..	2,570½ ,, ..	129 0 0	
5	Mustard	Akkadi ..	2½ ,, ..	0 6 0	
6	Avare	,, ..	18½ ,, ..	1 8 0	Do
7	Togari	,, ..	83½ ,, ..	7 0 0	
8	Niger	,, ..	25 ,, ..	1 4 0	
9	Horsegram	9 Acres ..	173 ,, ..	8 8 0	
10	Dry Chillies	8 Guntas	64½ Lbs. ..	6 8 0	
11	Green Chillies	Garden area	23¾ ,, ..	1 4 0	
12	Brinjals	,, ..	262 ,, ..	9 0 0	
13	Ladies finger	,, ..	8½ ,, ..	0 6 0	
14	Gorikai	,, ..	½ ,, ..	0 0 6	
15	Cucumber fruits ..	,, ..	16 ,, ..	0 2 0	
16	Potatoes	,, ..	12 ,, ..	0 6 0	
17	Peas	,, ..	9 ,, ..	0 9 0	
18	Sweet Potatoes	10 Guntas	449⅓ ,, ..	4 0 0	
19	Pumkpin	Garden area	19 ,, ..	1 3 0	
20	Onion flowers	4 Guntas ..	15 ,, ..	0 2 0	
21	Jaggory	5 ,, ..	160½ ,, ..	8 0 0	½ share.
22	Paddy	2½ Acres ..	445 Srs. ..	25 0 0	½ do
23	Onion	4 Guntas ..	184 Lbs. ..	1 12 0	
24	Khaki Jola (Green Fodder)	3 Acres ..	4,635 ,, ..	27 0 0	
				246 14 6	
	COLONISTS.				
1	Bangalore Beans ..	5 Guntas	60 Srs. ..	10 0 0	
2	Gingelly	3 Acres ..	300 ,, ..	28 0 0	
3	Ragi	4 ,, ..	2,165 ,, ..	108 4 0	
4	Mustard	Akkadi ..	86 ,, ..	1 0 0	
5	Togari	,, ..	88 ,, ..	8 0 0	
6	Avare	,, ..	36 ,, ..	3 0 0	
7	Kaki Jola	,, ..	70 ,, ..	5 0 0	
8	Groundnuts	3 Acres ..	1,000 Srs. ..	50 0 0	

No.	Name of crop	Area	Quantity in Seers	Approximate value	Remarks
				Rs. a. p.	
9	Dry Chillies	4 Guntas	87 Lbs. ..	12 0 0	
10	Garden Togari	5 „ ..	108 Srs. ..	12 0 0	
11	Caster	Akkadi ..	65 „	5 4 0	
12	Horsegram	3 Acres ..	345 „ ..	17 8 0	
13	Turmeric	1 Gunta ..	27 Lbs. ..	6 12 0	
14	Paddy	2 Acres ..	380 Srs. ..	23 0 0	
15	Jaggory	⅛ „ ..	2,208 Lbs. ..	125 0 0	
16	Paddy straw	..	2 Cart Loads	9 0 0	
17	Ragi straw	..	6 „ ..	36 0 0	
18	Fodder Jola Green ..	3 „ ..	14¾ „ ..	107 12 0	
				567 8 0	
	SCHOOL CULTIVATION.				
1	Ragi	10 Acres ..	2,155 Srs. ..	107 8 0	
2	Mustard	Akkadi ..	2 „ ..	0 4 0	
3	Kaki Jola	„ ..	70 „ ..	5 0 0	
4	Togari	„ ..	37½ „ ..	3 0 0	
5	Horsegram	6 Acres ..	225 „ ..	12 0 0	
6	Caster	½ „ ..	135 „ ..	9 0 0	
7	Garden Togari	Akkadi ..	150 „ ..	20 0 0	
8	Dry Chillies	13 Guntas	269 Lbs. ..	30 0 0	
9	Sunflower	1 Acre ..	102 Srs. ..	6 0 0	
10	Cotton	¼ „ ..	10½ Lbs. ..	0 12 0	
11	Tamarind	9 Trees ..	98 Mds. ..	98 0 0	
12	Gingelly	½ Acre ..	18 Srs. ..	2 0 0	
13	Ground Nut (H. G. I.) ..	3 Acres ..	1,900 Lbs. ..	114 0 0	
14	Potatoes	½ Acre ..	1,344 „ ..	36 0 0	
15	Bangalore Beans ..	8 Guntas	115 Srs. ..	19 0 0	
16	Greengram	½ Acre ..	40½ „ ..	5 0 0	
17	Blackgram	¼ „ ..	13¼ „ ..	1 12 0	
18	Plantains	1 „ ..	4,387 „ ..	25 0 0	
19	Onions	8 Guntas	1,095 ..	14 0 0	
20	Sweet Potatoes	2½ „ ..	593 ..	5 5 0	
21	Naiger	1½ Acres ..	75 Srs. ..	4 0 0	
22	Paddy	6 „ ..	1,928 „ ..	95 0 0	
23	Jaggory	½ „ ..	4,240 Lbs. ..	225 0 0	
24	Fodder Jola Green ..	10 „ ..	16,473 „ ..	108 0 0	
25	Fodder Jola Dry ..	10 „ ..	10 Cart-loads	50 0 0	
26	Paddy Straw	..	10 „ ..	50 0 0	
27	Ragi Straw	..	6 „ ..	36 0 0	
28	Jinger	½ Acre ..	165 Lbs. ..	6 0 0	
29	Turmeric	3 Guntas	35 „ ..	8 12 0	
30	Honey	..	5½ „ ..	5 8 0	
31	Avare, Hurali and Togari ..	..	3 Carts ..	12 0 0	
32	Pomegranets (Orchard) ..	..	4 ..	0 1 0	
33	Maize	12 Guntas	1,358 ..	5 0 0	
34	Bangalore beans ..	(Garden area)	111¾ Lbs. ..	2 5 0	
35	Onion Flowers		113 „ ..	1 0 0	
36	Raddish	3 Guntas	1,154-70½ Lbs.	5 8 0	
37	Ladies Finger	..	9½ Lbs. ..	0 4 6	
38	Ravadai Fruit	..	5 ..	0 4 0	
39	Cucumbers	..	85 ..	1 5 3	
40	Cucumber seeds	..	1½ Lbs. ..	6 0 0	
41	Greens	..	4½ „ ..	0 2 0	
42	Green Chillies	..	59 „ ..	3 0 0	
43	Pappoy	..	18 ..	0 9 0	
44	Sorekai	..	4 ..	0 1 0	
45	Togari Kai	..	12 „ ..	0 12 0	
46	Tuppada Hire Kai ..	..	33 ..	0 4 0	
47	Chapparada Avare ..	..	4 „ ..	0 3 0	
48	Avare Pods	..	41 „	2 0 0	
49	Pumpkin	..	1 ..	0 2 0	
50	Cattle Manure	..	250 Carts ..	250 0 0	
51	Milk	..	1,901 Srs. ..	237 8 0	
				1,630 5 9	

STATEMENT IV.

Statement showing Jaggory realised from the varieties of canes grown during the year 1932-33.

No.	Variety of cane	Average at the time of milling	Jaggory obtained	Area	Remarks
	(By Colonist).				
1	H. M. 320	12 Months ..	350 Lbs.	13 Guntas.	
2	H. M. 553	11 „ 20 days	1,113 „		
3	H. M. 500	10 „	72 „		
4	Local Pattapatti ..	11 „ 25 „	213 „		
			1,748 Lbs.		
	(By Tenants).				
1	Local Pattapatti	....	160½ Lbs. ..	6 Guntas	¼ School Shares.
	(By School Direct Cultivation).				
1	H. M. 544	11 Months 20 days	592 Lbs.	27 Guntas.	
2	H. M. 553	„ „	749 „		
3	H. M. 602	„ „	632 „		
4	J. 33. A.	11 „ 15 days	709 „		
5	Local Pattapatti ..	„ „	522 „		
6	H. M. 320	12 „ „	745 „		
7	Mixed Variety	11 „ „	191 „		
			4,140 Lbs.		

STATEMENT V.

Statement showing the total realisation of the Sale under various heads during the year 1932-33.

No.	Particulars	Amount	Remarks
		Rs. a. p.	Rs. a. p.
1	Sales of seeds etc.	1,403 1 0	By bill adjustment 280 3 10
2	Hostel	50 11 10	
3	Dairy Products	40 2 10	
4	Hire collected on Sugarcane mill ..	52 14 0	
5	Miscellaneous	12 10 1	
	Total ..	1,559 7 9	280 3 10
	Grand Total ..	1,839 11 7	

STATEMENT VI.

Statement showing the detailed budget grant and expenditure incurred during the year 1932-33 Ramarishna Krishi Sala.

No.	Budget Heads	Sanctioned Allotment	Additional Grant	Deduction by reappropriation	Total
1	2	3	4	5	6
		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Travelling allowance ..	200 0 0	....	46 0 2	153 15 10
2	Contingencies	1,046 0 0	....	122 4 6	923 11 6
3	Labour	1,750 0 0	....	190 10 0	1,559 6 0
4	Seeds and Manures	650 0 0	....	168 13 3	481 2 9
5	Buildings	350 0 0	1,189 3 1	....	1,539 3 1
6	Assessment	204 0 0	....	4 1 8	199 14 4
7	Hostel	1,000 0 0	....	777 5 6	222 10 6
	Total ..	5,200 0 0	1,189 3 1	1,309 3 1	5,080 0 0

No.	Budget Heads	Expenditure during the year	Bill adjustment	Total	Balance	Remarks
		7	8	9	10	11
		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
1	Travelling allowance ..	137 9 0	....	137 9 0	16 6 10	Lapsed.
2	Contingencies ..	666 14 6	256 13 0	923 11 6	..	
3	Labour	1,559 6 0	....	1,559 6 0	..	
4	Seeds and Manures ..	456 3 9	24 15 0	481 2 9	..	
5	Buildings	1,539 3 1	26 0 0	1,539 3 1	..	
6	Assessment	....	199 14 4	199 14 4	..	
7	Hostel	222 10 6	....	222 10 6	..	
	Total ..	4,555 14 10	507 10 4	5,063 9 2	16 6 10	

REPORT OF THE AGRICULTURAL SCHOOL, HASSAN FOR THE YEAR 1932-33.

Establishment.—Mr. C. B. Krishnamurthy who was in charge of the School was transferred from this place and since 11th March 1933, Mr. D. Balakrishna Rao, Agricultural Inspector, Hassan who relieved him continued to be in charge of the School in addition to his own duties till 28th May 1933, when he handed over charge to Mr. M. Vasudevamurthy, transferred to this place. From the 1st July 1933, the management of the School passed on to the District Board, Hassan—as per Government Order No. D. 4538-44—A. and E. 140-39-25, dated Bangalore, the 9th March 1933.

Number of Students was as follows during the year under report.

Number at the beginning of the year	16
Subsequent admissions	Nil
Total ..	16
Dropped in the middle	1
Remainder	15

Out of the 15, one has been absent due to sickness since 15th May 1933, did has not appear for the final examination of 1932-33.

According to community or caste the students have been distributed as follows as compared with the previous years.—

	1930-31	1931-32	1932-33
Brahmins	8	7	11
Christians	1	1	..
Vokkaligars	2	3	2
Lingayats	..	..	1
Adikarnatakas	..	1	..
Mahrattas	..	..	1

According to Districts the number has been as follows.—

	1930-31	1931-32	1932-33
Hassan	7	7	5
Mysore	2	3	2
Tumkur	2	..	4
Bangalore	..	1	..
Shimoga	..	1	1
Kadur	..	..	3

Examinations.—The Theory and Practical Examinations for 1932-33 were conducted during the first and second weeks of June 1933, the theory papers being set by Mr. Narayana Reddy, B.SC., (Edin.), Vice-Principal, Agricultural School, Hebbal, and Mr. S. H. Bennur, L.AG., Assistant Director of Agriculture, Mysore Circle and the Practical Examinations being conducted by Mr. S. Daniell, Assistant Director of Agriculture, Tumkur Circle and Mr. N. Venkatasubbaiah, Secretary, Mysore Agricultural and Experimental Union. The students of this school were in view of this arrangement submitted to the same standard of both theoritical and practical tests as those of the Chikkanahalli and Ramakrishnapur Schools.

The number of students who appeared for the examinations and passed is noted below in comparison with the previous years :—

	No. appeared for the examination.	No. passed.
1930-31	11	8
1931-32	12	13
1932-33	14	11

One of the students has stood first for all the three schools.

Instructions.—Teaching of different subjects both in theory and practice was carried on as in the previous years. Dry crops are raised within the compound of the School in very small plots. The area being very small and in between the blocks of buildings, it is not convenient to give the students practical training in the working of implements. Arrangements will be made to take about 10 acres of dry land on lease, adjoining the wet lands. It is desirable to have a couple of cows to give practical training in rudiments of Dairying and Live Stock Management.

Excursion.—This year the students were taken on tour to Arsikere and Channarayapatna Taluks and Balehonnur Coffee Experimental Farm.

Reading Room and Library.—The Library now contains 227 Volumes including the journals bound and added on to it. The following journals and newspapers are coming to the reading room. 1. The Hindu Illustrated Weekly, 2. Arthasadhaka Patrike, 3. Mysore Agricultural and Experimental Union Kannada Journal, 4. Vokkaligara Patrike, 5. Visvakarnataka, and 6. Taimadu.

Except the Journal of the Mysore Agricultural and Experimental Union, none of them contains matter which will be of use to the students of an Agricultural Institution. The matter will be discussed in the committee of management, and steps will be taken to provide the institution with journals dealing with Agriculture and allied sciences. The School may be placed on the circulating list of the Departmental Library books.

General Seasonal Conditions.—The last season has been one of heavy rains both during the South-West and the North-East Monsoons. Dry land crops have particularly suffered due to this excess. Owing to excessive and continuous rains, Kar and Hain Ragi suffered a good deal, and some of the paddy plots were deposited with sand.

Cropping.—One acre and 33 guntas were under wet cultivation and 2 acres and 3 guntas under dry crops. Almost every bit of land available within the compound of the School is under Crops, such as Ragi varieties, Groundnut, Potatoes, Fodder, Jola and Vegetables.

A number of experiments on different varieties of crops and manures were conducted by the students.

C. NARSINGARAJU,
Offg. *Assistant Director.*

REPORT OF WORK DONE FOR 1932-33, IN GOVERNMENT EXPERIMENTAL FARM, MARTHUR.

Mr. K. A. Krishnan, Agricultural Inspector, continued to be in charge of the Farm till 2nd January 1933; when he went on leave, Mr. T. Krishnaswami, Agricultural Inspector, Sagar, was posted in his place.

Permanent Improvement.

About three-fourths of an acre of uncultivated land near the threshing floor in dry area was brought under cultivation. Very thick jungle growth in the area between the cattle shed and the Soppinbetta coffee area about 10 guntas in extent was cleaned and put under ginger.

Besides these, quite a lot of bush clearing was done all round the border land.

The old office building that was in a very dilapidated condition was dismantled and a new one was constructed with laterite stone walls, using the old roofing materials. The store room was provided with cement concrete flooring with rat proof arrangement all round.

Season.

Rainfall during the calendar year 1932 was 132·16 inches spread over 145 days, which is about 28·5″ more than the average for the past 28 years, and heaviest except the year 1923 when 149·0 inches were recorded. The highest rainfall in a day during the year 1932 was 6·5″, the total rainfall from January 1933 to the end of May 1933 was 8·47″ spread over 19 days. As usual the first quarter of 1932 was a trying one and the monsoon commenced in proper time. There was almost continuous rain from June to September 1932, when over a 100″ were recorded. (For details, *vide* Statement No. I).

The highest maximum temperature that was recorded was 88·8 Fr. and the lowest minimum 60.5 Fr.

Garden.

Areca.—Old garden 4½ acres. The whole garden was sprayed with resin soda bordeaux mixture. There were a few cases of Koleroga disease in August and the affected portions were re-sprayed. The yield during the year was 2,697 lbs. and that of last year was 3,080 lbs. The low yield is reported to be due to the death of a number of old trees. Yields for the past 10 years are given below for comparison :—

Year	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33
Weight in lbs.	3,145	3,092	2,982	3,482	2,310	2,655	2,820	2,918	3,080	2,697

The whole garden received a liberal dose of cattle manure; application of fresh earth was not taken up for want of funds. Results of fertilizer tests will be given in the report of the Agricultural Chemist.

New Areca Garden.—Planting the new garden with seedlings of specially selected varieties will be taken up soon after the monsoon is over. All the varieties of plantain put in for shade have come up but are not yielding satisfactorily due to water logged condition of the plot.

The under planting comprising of varieties of pine apple and cardamom are also bearing.

Pine Apple.—Imported varieties of pine apple planted about three years ago have established very well. The varieties grown are :—1. Queen, 2. Kew, 3. Mauritus and 4. West Indian. The area under these will be extended in the season. Average weight of each fruit of different varieties are as follows :—

1. Queen.
2. Kew 1 lb. 5 oz.
3. Mauritus 1 lb. 3 oz.
4. West Inidan 1 lb. 2 oz.

Fruits weighing even 6 lbs. have been obtained from the Kew variety. Although the Queen variety yields smaller sized fruits it is very much sweeter than the other

varieties. The Kew variety fruits in very large number in July and August, and the Mauritius and West Indies frints mostly during the earlier part of the year.

Pepper.

The yield of pepper during the year is poor when compared with that of last year, being 108 lbs. as against 192 lbs. (dry weight).

Yield for the last five years.

Year	1928-29	1929-30	1930-31	1931-32	1932-33
Lbs.	85–8	31–0	153–8	192–0	108–0

The average yield for the five years preceding is 44 lbs. (dry). The average yield per plant during the year of the Malabar and Local varieties is as follows :—

Malabar variety 2 lbs. 10 oz. (for 149 plants).
Local „ 1 „ 1 „ ..

Out of 308 Malabar pepper vines, only 149 are bearing. The Malabar Cuttings—The basket layerings planted in the year 1930-31 have not yet commenced to yield. The former is alive in 92 trees and the latter in 240 trees.

Out of selected cuttings, (cuttings from plants which have given a yield of more than 3 lbs.) planted to 50 areca trees in the same year, vines planted to 32 trees only are surviving and they are also not bearing. Seven hundred and ninety-nine cuttings and 224 basket layerings were distributed ; the demand for cuttings is on the increase and it is not possible at present to meet all the demand from the Farm.

Cardamom.

The plants in the old garden have yielded this year 10 lbs. 11 oz. of dry cardamom, and the yield last year was only $3\frac{3}{4}$ lbs. Selected varieties of seedlings obtained from Manjanabad and Siddapur about two years ago and planted, are coming up well. But they have not begun to yield any crop worth mentioning.

Paddy.

The total area under paddy was 16 acres and $3\frac{1}{2}$ guntas, of which 8 acres and $14\frac{1}{2}$ guntas were under bulk crop (G.E.B. 24). The yield of G.E.B. in this area works out to 2,110 lbs. as against 1,432 lbs. last year.

Varietal Tests.

Area—1 *acre and* 20 *guntas.*—The varietal tests 1932-33, with individual selections from the Botanical Section were taken up only last season. In addition to $3\frac{1}{2}$ cart-loads of cattle manure, the plot received 120 lbs. of ammonium sulphate and 240 lbs. of supers. Si. 1,329, stands first, yielding 2,740 lbs. of grain and 4,740 lbs. of straw, and closely followed by Togarina, (grains 2,640 lbs. and straw 4,240 lbs.) and Musally (grains 2,600 and straw 5,720). For details *vide* Statement No. II.

Manurial Tests.—Application of single and double doses of paddy mixture. The yields from differently treated plots are as follows :—

Year.	1932-33.
Single dose	2,106 grn. 2,134 straw.
Double dose	2,332 „ 2,636 „

Single and Double doses of Chemical Manurial test on G.E.B. 24 Paddy for the year 1932-33, (Area 1 acre).

Plot No.	Area	Treatment	Yields of plots in lbs.				Remarks
			Grain	Straw	Grain	Straw	
..	..	I. Sowing single dose $Am_2 So_4$	576	594	..	..	..
		80 lbs. Supers 168	477	473	2,106	2,134	II
..	..	II. Sowing double dose—160 lbs.	580	728	..	..	..
		$Am_2 So_4$=336 lbs Supers ..	581	640	2,332	2,636	I
		Total ..	2,214	2,435	2,214	2,435	..

(1) Area one acre, (2) Variety G.E.B., (3) Date of transplanting—12th July 1932 and (4) Date of Harvesting—13th and 14th December 1932.

Though the order of merit is reversed in the year 1931-32, the difference in the yield of grain being only 22 lbs. which is ignorable, it is significant taking into consideration, the results of all the three years, that the double dose plots give increased yield, but not in proportion to the extra cost involved in manuring.

The difference in yield of grains varies only from 200 to 300 lbs.

Phosphate Manuring of Green Manure Crops.—This experiment has been discontinued from this year. The result of experiment in the year 1931-32, is any the better than in the previous year, though the green manure crop gave a slight increase in the yield. Two years' trials have conclusively proved that Phosphate manuring of green manure crops does not beneficially influence the paddy crop succeeding it, and that direct application of Phosphate manure to paddy crop results in greater yield.

Ammonium Sulphate and Super Mixture compared with Ammophos.—The results of this year are in favour of Ammonium sulphate mixture as in the year 1930-31, but in 1931-32, it is just the reverse.

	Area	Yield per plot		Yield per acre	
	A. G.	Gr. lbs.	Stw. lbs.	Gr. lbs.	Stw. lbs.
1. Ammophos 20—20—10 lbs. and Super 5 lbs.	0 4	173	209	1,730	2,090
2. $Am_2 So_4$—8 lbs. and Supers 16 lbs. ..	0 4	187½	236	1,870½	2,360
3. Check	0 4	126½	167	1,260½	1,670
Total ..	..	487	612	1,623·3	2,040

The variety of paddy in all these areas transplanted is G.E.B.

Liming Experiments.

Liming Experiment in "H" Range on the Marthur Farm on G.E.B. Paddy for 1932-33.

Area—10 Guntas.

Plot No.	Area	Treatment	Yield plot in lbs.		Yield per acre in lbs.		Remarks
			Grain	Straw	Grain	Straw	
16 (*a*)	..	Check	118	163	..	..	..
17 (*b*)	..	„	108	171	1,808	2,672	I
16 (*b*)	..	Lime	103	140	..	..	..
17 (*a*)	..	„	118	188	1,768	2,624	II
		..	447	662	1,788	2,648	..

(1) Area—10 guntas. (2) Variety—G.E.B. (3) Date of sowing—28th April 1932. (4) Date of harvesting—2nd—5th December 1932. (5) Lime, 280 lbs.

Not very encouraging results are obtained during the year under report in favour of limed plots, as in the year previous to this. The decrease is however being 40 lbs. of grain and 48 lbs. of straw to an acre.

Chemical Section, Manurial Experiments.—The nature of Experiment carried out in I. and G. Ranges continued to be the same this year also. In G. Range 10th and 11th plot experiments of Ammophos have beaten all the others, followed by Ammonium sulphate, Supers and Niciphos; whereas Ammonium sulphate and Supers stood first last year, and the Ammophos took the third place along with Niciphos. But in the 12th plot of the same Range, Calcium-cyanide and Supers have given the highest yield as in the previous year. Results are given in Statement No. III.

In I. Range the order of merit is as follows :—

Groundnut cake 12·25 lbs. Supers. 11 lbs. Plot 30, 33, 36.	1932-33	I.
Ammonium-sulphate 3·75 lbs. Supers 8·25 lbs. Plot 3, 6, and 9.	,, ..	II.
Groundnut cake 10 lbs. Supers 8·25 lbs. Plot 29, 32 and 35.	,, ..	III.

SUGAR-CANE.

The area under sugar-cane was only one acre. The growth was good. Results of varietal tests for 1932-33, are as follows :—

Repea ed thrice.

Variety	Area in Guntas	Yield of cane per plot. Lbs.	Yield of cane per acre. Lbs.	Brix	Remarks
H.M. 544 ..	0-1·9	2,768	58,273	17	This figure includes all the strips of each variety.
,, 553 ..	,,	3,326	70,021	18	
,, 320 ..	,,	2,607	55,515	19	
Java ..	,,	2,258	47,536	20	
H.M. 332 ..	,,	2,969	62,505	20	

Application of Red Earth to Cane Crop.—This experiment was taken up only this year and the results are noted below :—

1932-33.

Treatment	Area in Guntas	Wt. of cane of plots in lbs.	Wt. of cane of acre in lbs.	Brix	Remarks
		Variety of cane H.M. 544.			
Red Earth ..	0-4·6	6,053	52,652	18.5	
Check ..	,,	5,767	50,147	19	

Liming Experiments.—This year, only H.M. 553 cane was used for the test. The difference in the yield of lime and unlimed plots is very small in 1932-33.

The results for 1932-33 are as follows :—

Treatment	Area in Guntas	Wt. of cane of plots in lbs.	Wt. of cane in lbs. per acre	Brix	Remarks
Lime ..	0-4·6	6,156	23 tons 2,010 lbs.	17·5	Lime at one ton per acre.
No lime ..	,,	5,973	23 ,, 419 lbs.	,,	

Artificial Fertilizers, vs., Cattle Manure.—The variety of cane used for this test is also H.M. 553. The increase in the yield of plot treated with Ammonium Sulphate and Supers is little over 3 tons per acre.

Treatment	Area in Guntas	Wt. of cane per plot in lbs.	Wt. of cane per acre in lbs.	Brix	Remarks
*Cattle manure	4·6	4,318	16 tons 1,707 lbs.	17·36	*Cattle manures 36 cart-loads per acre.
Artificials ..	4·6	4,963	19 ,, 596 lbs.	17	$Am_2 So_4$-280 lbs. per acre. Supers 400 lbs. per acre.

This year nearly half the produce was converted into brown sugar with very little extra cost, and the rest was made into Jaggory. It is encouraging to note that the brown sugar fetched Rs. 2-4-0 per maund and the jaggory Rs. 1-4-0 per maund in Sagar Market.

Baje.

Area under this crop remains the same. It was harvested in May and yielded 98 lbs. of half dried rhyzomes.

Turmeric.

The crop was planted in dry area in May 1932. Being poor in growth it was not removed. It is coming up vigorously after the recent rains.

Ragi.

The area under Ragi was 3 acres and 27 guntas. The results of the bulk trials are given in the statement below. Violet open has given the highest yield this year, while violet compact was first last year.

Bulk yield for 1932-33.

Plot	Variety	Area in guntas	Date of sowing	Date of flowering	Date of harvesting	Yield per plot in lbs.		Yield per acre in lbs.		Remarks
						Grain	Straw	Grain	Straw	
1	Violet open ..	40	14-6-32	7-10-32	7-12-32	754	804	754	804	
2	,, compact ..	26	11-6-32	,,	14-12-32	114	135	175	207	Treatment 15 cart-loads of cattle manure.
3	H2	15	,,	5-10-32	7-12-32	220	237	586	632	
4	H22	18	12-6-32	9-10-32	17-12-32	143	253	317	562	
5	H40	22	,,	14-10-32	26-12-32	353	304	641	552	
	Total ..	3-1	..	..	..	1,584	1,733	4,948	5,514	..

In varietal trials local variety stood first and next in order are H2 and MM3. Whereas last year MM1 took the first place, MM3 second and MM2 third.

1932-33.

Plot	Area	Varieties	Date of sowing	Date of flowering	Date of harvesting	Yield in lbs. per plot		Yield in lbs. per acre		Remarks
						Grain	Straw	Grain	Straw	
H. Range	Two guntas each variety	H2	10-6-32	19-9-32	7-12-32	40	57	800	1,140	
	,,	Jainumudde ..	,,	7-9-32	,,	25	34	500	680	
	,,	K2	,,	1-9-32	,,	8	10	160	200	
	,,	K1	,,	,,	,,	8	13	160	260	
	,,	MM1	,,	6-10-32	,,	26	64	520	1,280	
	,,	MM2	,,	,,	,,	36	103	720	2,060	
	,,	Local	,,	,,	,,	43	84	860	1,680	
	,,	MM4	,,	18-9-32	,,	33	71	660	1,420	
	,,	Rudra Jade ..	,,	19-9-32	,,	23	30	460	600	
	,,	Jade sange ..	,,	,,	,,	21	34	420	680	
	,,	H40	,,	,,	,,	25	52	500	1,040	
	,,	H22	,,	,,	,,	28	57	560	1,140	
	,,	MM3 ..	,,	,,	,,	39	78	780	1,560	III
		Total ..	..	..	..	355	787	546	1,057	..

Chillies.

Area 1 acre and 15 guntas, variety MF 1.

1932-33.

Yield.	Green.	Dry.	(2 ac. and 7 guntas.)
In lbs.	395	126	

On account of heavy rains, the crop this year did not come up well.

Ginger.

Soil and climatic conditions of the Farm seem to be admirably suited to ginger crop. The area under this crop will be gradually extended. Different methods of curing ginger will be taken up next year. The area under this crop was 31 guntas. Only a portion of the area was harvested yielding 58 maunds.

Ground-nut.

The area under this crop was 1 acre and 36 guntas, of which 20 guntas were under H.G. I and the rest under Tennesse, Spanish and Valencia, (8 guntas each). Of these, Tennesse has given the highest yield, and H.G. I comes second.

1932-33, (both varietal and bulk).

Plot	Area in guntas	Variety	Date of sowing	Date of flowering	Date of harvesting	Yield per plot lbs.	Yield per acre lbs.	Remarks
Dry area 'D'	..	Bulk	15-6-32	9-8-32	25-10-32	164	328	II
	20	H.G.I Variety.						
'E'	8	Tennesse ..	13-6-32	,,	,,	72	360	I
,,	8	Spanish ..	,,	,,	,,	52	260	III
..	8	Velencia ..	,,	,,	,,	50	250	IV
	44	or 1 acre and 4	guntas.	..	..	338	299.5	

Coffee.

During the year 1931-32, 1¾ acres were planted under coffee mostly under Robusta. One hundred and seventy-two Roubsta seedlings got from Balehonnur, were also planted round the dry land well. Nearly 70 per cent of the plants, in the Soppinbetta flowered during the last week of April 1932 and all of them shed except one or two plants, and so also, even this year;

but the plants are growing vigorously. Watering the plants in dry area during summer was discontinued from this year. The shade trees are all coming up well.

In dry area where there is very little shade, an experiment is being tried for the past two years to find out the effect of different kinds of mulching to keep down weeds, and preserve moisture in the soil.

Details of Experiments are as follows :—

(*a*) Two rows are given soil mulching.
(*b*) ,, leaf ,,
(*c*) ,, Crop of Bogamedalla.
} Repeated twice.

Plants in 'B' are coming up very vigorously, and there is very little of weed in the area; in 'A' the plants are not half so good as in 'B' and the plot is weedy; in 'C' the plants are faring badly and the area is very badly weedy.

Mango.

Mulching of the soil was given this year also as usual. During the season the trees flowered very well but most of the fruits shed when they were very tender. *One Clove and* 16 *Nutmeg plants are surviving.*

C. NARSINGARAJU,
Offg. *Assistant Director.*

STATEMENT No. I.

Rainfall record for the year 1932.

Month	No. of days	Rainfall	
		Inches	Cents
January	..	..	..
February	..	..	..
March	..	..	..
April	6	..	91
May	12	6	61
June	26	13	40
July	29	56	89
August	22	23	..
September	24	15	84
October	16	12	42
November	9	2	70
December	1	..	39
Total rainfall ..	44	132″	16 cents

STATEMENT II.

Varietal Paddy Experiment on the Marthur Farm for 1932-33.

1 acre 20 guntas.

Acre in guntas	Names	No. of plots	Date of sowing	Date of flowering	Date of harvesting	Yield per plot in lbs.		Yield per acre in lbs.	
						Grain	Starw	Grain	Straw
Two guntas.	W. 3629	2, 38	12–5–32	5–10–32	3–11–32	122	213	2,440	4,260
,,	W. 529	4, 40		4–10–32		117	196	2,340	3,920
,,	Walya	27, 63	13–5–32	5–10–32	28–11–32	115	199	2,300	3,980
,,	A. 229	3, 39	,,	,,	,,	90	219	1,800	4,380
,,	A. 1829 ..	11, 47	,,	,,	,,	76	173	1,520	3,460
,,	A 1429	17, 53	,,	4–10–32	,,	75	158	1,500	3,160
,,	A. 1029	23, 59	,,	,,	,,	78	164	1,560	3,280
,,	H. O. 629 ..	5, 41	,,	,,	,,	109	198	2,180	3,960
,,	Si. 1029	29, 65	,,	,,	,,	117	266	2,340	5,320
,,	H. O. 529	32, 68	,,	8–10–32	,,	119	196	2,380	3,920
,,	H. B. 829	8, 44	,,	9–10–32	,,	106	285	2,120	5,700
,,	H. B. 1529	22, 58	,,	4–10–32	,,	74	219	1,480	4,380
,,	H. B. 229	28, 64	,,	,,	,,	100	197	2,000	3,940
,,	H. B. 1629	34, 70	,,	,,	,,	76	250	1,520	5,000
,,	H. B. 1929	35, 71	,,	,,	,,	90	267	1,800	5,340
,,	B. H. 4429	9, 45	,,	3–10–32	,,	97	180	1,940	3,600
,,	D. 329	14, 50	,,	5–10–32	,,	112	231	2,240	4,620
,,	T. 129	15, 51	,,	9–10–32	,,	105	165	2,100	3,300
,,	H. A. 2129	20, 56	,,	5–10–32	,,	82	192	1,840	3,840
,,	Si. 1329	26, 62	,,	9–10–32	,,	137	237	2,740	4,740
,,	G. Rosk	10, 46	,,	23–10–32	,,	64	170	1,280	3,400
,,	G. Temas	16, 52	,,	,,	,,	56	120	1,120	2,400
,,	G. Sivmnkote	27, 57	,,	23–9–32	,,	68	167	1,360	3,340
,,	Tigima	33, 69	,,	2–10–32	,,	74	241	1,480	2,820
One gunta.	Walya	6	12–5–32	5–10–32	3–11–32	49	92	1,960	3,680
,,	Hosalibilo	12		,,		48	86	1,920	3,440
,,	Siddasale	18	13–5–32	,,	28–11–32	49	74	1,960	2,960
,,	Dod. Bile	24	,,	4–10–32	,,	51	86	2,040	3,440
,,	Hosadi	30	,,	,,	,,	44	124	1,760	4,960
,,	Alursanna	36	,,	,,	,,	40	94	1,600	3,760
,,	Bhave	42	,,	2–10–32	,,	54	78	2,160	3,120
,,	G. E. B.	48	,,	,,	,,	52	105	2,080	4,200
,,	Somasle	54	,,	,,	,,	52	95	2,080	3,800
,,	Togarina	60	,,	6–10–32	,,	66	106	2,640	4,240
,,	Jeddu	66	,,	,,	,,	63	125	2,520	5,000
,,	Musally	72	,,	5–10–32	,,	65	143	2,600	5,720

STATEMENT No. III.

Chemical Manurial Experiments on Walya Paddy 'I' Range for the year 1932-33, Marthur Farm. Area 36 guntas only.

Plot No.	Area	Treatment per plot	Yield of plot in lbs.		Yield per acre in lbs.	
			Grain	Straw	Grain	Straw
1	..	....	32	28	..	..
4	..	Check	53	35	1,586	1,280
7	..	....	34	33	..	..
2	..	....	24	23	..	..
5	..	Ammn. sulphate 3·75 lbs. ..	39	43	1,386	1,413
8	..	....	41	40	..	..
3	..	Ammn. sulphate 3·75 lbs. ..	40	38	..	..
6	..	Supers 8·25 „ ..	47	47	1,773	1,720
9	..	....	46	44	..	..
10	..	Ammn. sulphate 2·5 lbs.	40	38	..	..
13	..	Supers 5·5 „	34	34	1,500	1,460
16	..	....	39	38	..	..
11	..	Ammn. sulphate 3·75 lbs. ..	32	34	..	..
14	..	Supers 8·25 „ ..	43	43	1,586	1,600
17	..	....	43	43	..	..
12	..	Ammn. sulphate 5 lbs.	33	38	..	..
15	..	Supers 11 „	44	45	1,680	1,746
18	..	....	49	48	..	..
19	..	Ammn. sulphate 3·75 lbs. ..	46	41	..	..
22	..	Supers 6·75 „ ..	41	43	1,626	1,653
25	..	....	35	40	..	..
20	..	Ammn. sulphate 3·75 lbs. ..	41	38	..	..
23	..	Supers 8·75 „ ..	44	41	1,660	1,600
26	..	....	40	41	..	..
21	..	Ammn. sulphate 3·75 lbs. ..	39	38	..	..
24	..	Supers 12·5 „ ..	43	41	1,680	1,573
27	..	....	44	39	..	..
28	..	Ground-nut oil cake 6·25 lbs. ..	43	47	..	..
31	..	Supers 5·5 „	39	38	1,613	1,693
34	..	....	39	40	..	..
29	..	Ground-nut oil cake 10 lbs. ..	41	38	..	..
32	..	Supers .. 8·25 lbs. ..	42	45	1,673	1,693
35	..	....	45	44	..	..
30	..	Ground-nut oil cake 12·25 lbs. ..	46	46	..	..
33	..	Supers 11 lbs.	42	43	1,840	1,800
36	..	....	50	46	..	..
		Total ..	1,473	1,441	1,636	1,601

(1) Date of transplanting— 5th August 1932.
(2) Date of Flowering— 23rd October 1932.
(3) Date of Harvesting— 8th December 1932.
(4) Green manure 175 lbs. per plot (7,000 lbs. per acre).

STATEMENT No. III—*concld.*

Chemical Manurial Experiments in 'G' Range, Walya Paddy for 1932-33.
Area 1 acre 24 guntas.

Plot No.	Area	Treatment per plot	Yield per plot in lbs.		Yield per acre in lbs.		Remarks
			Grain	Straw	Grain	Straw	
G. 10, 11							
1	..	Check	84	128	..	..	
6	..	,, ...	81	110	1,500	2,490	V
11	..	,, ...	79	123	..	..	..
16	..	,, ...	56	137	..	..	..
2	..	Ammn. sulphate 10 lbs. ..	95	144	..	..	..
7	..	Super phosphate 22·5 lbs.	84	121	1,680	2,646	II
12	..	....	73	132	..	..	..
3	..	....	79	109	..	..	..
8	..	17–45 Niciphos. 9 lbs. ..	74	114	1,620	2,393	III
13	..	....	90	136	..	..	..
4	..	....	86	133	..	..	..
9	..	13–48 Ammophos 8·5 lbs. ..	87	158	1,720	2,800	I
14	..	....	85	129	..	..	..
5	..	Sodium nitrate 13·5 lbs. ..	68	95	..	..	..
10	..	Super phosphate 22·5 lbs. ..	70	136	1,506	2,486	IV
15	..	....	88	142	..	..	..
G. 12							
17	..	Ammn. Sulphate 10 lbs. ..	92	166	..	..	..
20	..	Super phosphate 22.5 lbs. ..	104	174	1,813	3,186	II
23	..	....	76	138	..	..	..
18	..	Cal. Cynomide 10.5 lbs. ..	105	164	..	..	..
21	..	Super phosphate 22.5 lbs. ..	101	164	2,080	3,186	I
24	..	....	106	150	..	..	..
19	..	....	88	151	..	..	..
22	..	Check	84	126	1,720	2,770	III
G. 9							
1	..	....	81	101	..	..	..
2	..	....	79	113	..	..	..
3	..	....	76	75	..	..	..
4	..	....	86	109	..	..	..
5	..	Check	55	81	1,467	1,862	..
6	..	....	74	95	..	..	..
7	..	....	67	82	..	..	..
8	..	....	69	89	..	..	..
		Total ..	2,622	4,027	1,639	2,517	..

Date of Transplanting—16th—19th July 1932.
Date of Flowring—8th October 1932.
Date of Harvesting—28th—29th November 1932.
150 lbs. of sunn hemp applied to each plot of two guntas, *i.e.*, 3,000 lbs. per acre.

REPORT OF WORK DONE IN THE GOVERNMENT COFFEE EXPERIMENTAL STATION, BALEHONNUR, DURING THE YEAR 1932-33.

Administration.—The permanent Manager having been posted to the charge of Chikmagalur Divisional Office after the death of Dr. M. K. Venkata Rao, the Plant Breeding Inspector, Mr. Y. R. Narayana Rao was temporarily placed in charge of the Station. He was subsequently confirmed as the Manager of the Farm. Mr. Venkatesiah, Horticultural Diploma Holder, who was employed as Grafter was appointed as Plant Breeding Inspector.

Mr. Mayne, the Coffee Scientific Officer of the United Planters' Association of South India has been continuing his researches on coffee diseases on the Station. Hearty co-operation exists between this officer and the station Staff. At present Mr. Mayne is absent abroad on leave and his work is being looked after by his assistant Mr. Subramaniam.

Two members of the Coffee Advisory Committee, Messrs. T. B. Malle Gowda and A. E. J. Nicholls retired from the Board and Messrs. Vasudeva Rao and L. Newcome were appointed members, the former to represent North Mysore Planters' Association and the latter United Planters' Association of South India. Two meetings of the Board were held during the year.

Area.—The Station possesses 105 acres of coffee under cultivation of which 82 acres are mature coffee. The rest is young coffee mainly comprising of the different species, varieties and types of coffee intended as a breeding stock. A small area is planted with Cardamom varieties. The vast jungle area under the possession of the Farm is intended for future improved seed development work.

Rainfall and Seasonal Conditions.—During the year under report there was a total rainfall of 108.74 inches almost equal to the rainfall of the previous year. Although this amount of precipitation was more than normally required for coffee, yet there was no marked ill-effect for cultural operation of the previous season. But the early rains in February 1933 caused some damage to future crop. Apart from being too early, the rains fell in insufficient quantities at frequent intervals which did not conduce to good blossom setting and crop estimation. Nevertheless, it is to be taken satisfactory on the whole.

Health of the Station.—During the year there were two deaths: one from old age and the other from anemia. Malaria is the common complaint everywhere in the plantation districts but on the station severe attacks have not occured. The health of the station therefore continues to be fair and satisfactory.

Experiments.—These experiments fall into three groups:—

(1) Manurial, (2) Spraying, and (3) Plant Breeding.

The manurial experiments are being conducted with a view for testing (*a*) effects of various forms of N., P., K., both individually and in combination, (*b*) variation of plant food ratio, time of application and dosage experiments; while another set of experiments are started (*c*) wherein the standard ratio of 25 lbs. N. 37 lbs. P2O5 and 50 lbs. K2O per acre is raised to 30 N. 45 P2O5 and 60 lbs. K2O respectively and on this basis several mixtures consisting of organic and inorganic manures are tried.

While no satisfactory and definite results are available with regard to manuring of coffee, the tentative conclusions that are only possible now throw sufficient light as to the way in which manuring has to be pursued. Sulphate of Ammonia in the class of N. Supers in P2O5 group and Kcl in potash seem on the whole to show better results as compared with other organic or inorganic sources of the same element; and also it is shown by the results at our disposal that a combination of these three manures have shown the best result.

The results obtained do not seem to admit of easy interpretation either statistically or otherwise owing to the nature of the lay out of plots, soil, shade and climatic

variations ; and greatest of all the heterogeneous character of the plants themselves in the experimental plots. Therefore, a scheme is under consideration to remodel and alter the size of plots and their proper distribution having due regard to other governing factors in the estate.

Spraying Experiments.—Considerable attention is being paid to find out an effective cheap fungicide in combination with or without a suitable adhesive. The economic strength of mixture to be used and the time of spraying to obtain the maximum results are also being studied. In addition to these, testing of spraying outfits is going on.

The results so far obtained indicate the superiority of Casein Bordeaux over Resin Bordeaux while Resin Burgundy has not come up to expectation. Linseed oil Bordeaux is appreciably good and compares very favourably with Casein Bordeaux. Alum Bordeaux has not shown itself as capable of displacing either linseed oil bordeaux or casein bordeaux. No adhesive bordeaux is showing decided advantage over control check plots to the extent of over 150 per cent. But, as shown by the crop yield, there is positive advantage with the use of adhesive over no adhesive bordeaux but it remains to be established that the increased yield will more than compensate the extra cost involved in the use of adhesive. However, the spraying experiments do point to the fact that no adhesive bordeaux would certainly improve yields when heavy financial consideration prevents the use of combined sprays.

Half strength casein bordeaux plot seems to be equal if not better than one per cent bordeaux-casein. Although the results on this score are not yet complete, the presumption is that where leaf-rot is not at all very serious, half strength sprayed twice a year would satisfy our expectation.

As regards the time of application of sprays, the pre-monsoon spray is decidedly to be preferred to the post-monsoon spray alone while pre and post monsoon sprays have undoubtedly demonstrated the desirability of giving two sprays to bring the best possible results.

During the year under report a new power sprayer manufactured by Drake and Fletcher & Co., of Maidstone, England, has been tried and found satisfactory both as regards cost of spraying and output of work. The new Drake and Fletcher power sprayer is powered by 2 H.P. peter engine and is geared to a twin pump which is adopted to discharge the liquid on six lines of hoses. The fuel consumption is found much cheaper than holder power sprayer with 4 lines of hoses while the total working cost comes to Rs. 2-2-0 per acre as against Rs. 2-10-0 in the other sprayer. Also this gives a larger output of work and is capable of spraying from 3½ to 4 acres in a day depending upon estate condition.

Entomological Work.—At present no Entomological investigation is undertaken on the station for such work as the coffee borer beetle pest is at present engaging the attention of the Departmental Entomologist elsewhere on private estates. It is interesting to state that systematic spraying conduces to lessening the havoc of borer pest as is observed by the station records of borer plants removed each year. Plots receiving no spraying show heavy infection.

Plant Breeding Work.—This comprises selection, crossing or hybridizing and grafting work. An examination of the buds in the very early stage of their development shows an indication as to their true value in breeding work. Only those that show the presence of fertile anther, *i.e.*, contain pollen sacs are selected for breeding work. Such of the plants that exhibit the above character, and possess other desirable traits of a planter's ideal plant and in addition show marked resistance to leaf disease are alone selected for breeding work. These plants are either selfed for multiplication and further study or cross-bred with the pollen selected from a desirable plant. The effort of our work in this direction during the past year has given sufficient materials for future work. During blossom time in February—March 1933 several F1 generations were selected for further breeding and many such have been selfed. Some of them show marked difference in appearance as compared with the parent plant. We are now on our way to produce F2 seedlings. As a result of our work in 1932 there are 3,929 selfed seedlings and 3,986 crossed seedlings all of which are growing satisfactorily in the nursery beds. These are allowed to remain in the nursery for a longer period than is desirable mainly because to eliminate those that take leaf disease after artificial inoculation by Mr. Mayne. By this test, it is intended not only to discard undesirable types but also to economise space in our experimental plot lay out.

In the year under report 23 hybrid arabicas were crossed with selected Kents and Coorgs and 54 selections were selfed. The berries are developing satisfactorily and it is likely we will add a very big number of seedlings into our F1 generation. Robusta crossed on Arabica have given fertile seeds while Arabica on Robusta has not given satisfactory results. Selfing Robusta has proved a failure. The following table shows the progress of plant breeding work :—

	1930		1931		1932		1933
	Self	Cross	Self	Cross	Self	Cross	
Number of seeds obtained ..	330	49	471	257	3,929	3,986	Results not available.
Number of seedlings got	120	16	268	192	3,325	3,491	

Grafting.—Grafting experiments are being conducted since 1930. Both grafts in the nursery and in 'situ' in the old estate patches are done. While we are not in a position to discuss which of the two above methods is the best and safest, grafting in 'situ' in estate patches offers the most economic way of raising grafts. Further points of great importance have been elucidated, *viz.*, the time of grafting, kind and age of stock and scion to use and also the use of suitable but cheap covering materials to the grafts.

March to September offers the best period for grafting, for, during this period greater number of successes are obtained. Stocks of 1 to 1½ years old when grafted with a matured woody or semi woody scion, *i.e.*, having cambium tissue approximately of the same age result in an increased percentage of success. Stocks of Robusta and Netraconda hybrid are being used while the scion is selected from specially selected Arabica mother plants which are mainly retained for yielding suckers for grafting work. Evidence of incompatibility between stock and scion is manifest in many cases which is mainly attributable to the kind of robusta stock used. This is under investigation.

At present we have grafts of all ages extending over an acre and a half of which some older grafts are in bearing. For comparison a plot is laid out where grafts from scions and seedlings raised from the seeds of one and the same mother plant are used. Many grafts raised during the year are awaiting transplantation into beds.

Another mode of plant propagation by means of suckers laid in beds for rooting is in progress. This method of multiplication is a very slow one and if successful, it is one of the best, safest and quickest way of multiplying the most desirable progeny. Cuttings of Robusta and Arabica are being laid in bed in each month and their development and progress is being watched.

Cardamom and Pepper.—Several varieties of cardamoms have been planted. Breeding work will be taken up as soon as they begin to bear. Manuring of cardamom has been taken up on systematic lines.

The varieties of Malabar pepper are growing satisfactorily. They are too young yet for layering for further multiplication. It is hoped to multiply and plant up a large area so as to be able to meet the demand of growers for these varieties.

H-ion Cisterns.—The question of acid or alkali tolerance of coffee is being studied. The 36 cisterns are planted up with uniform selfed Arabica seedlings. The treating of cisterns with acid and alkali is being carried on. Definite results are not yet available.

Preservation of Nursery Bamboo Baskets.—One other important experiment was conducted in connection with the preservation of nursery bamboo baskets by treating them with Copper Sulphate solution of various concentration.

This experiment is still being continued to compare results obtained previously. However, it may be mentioned that baskets steeped in 4% Copper Sulphate solution and boiled for two minutes show better keeping qualities as compared to unboiled or baskets dipped with plain bordeaux solution.

Four per cent Copper Sulphate solution seems to be quite adequate to preserve the baskets in tact for over 10 months or even more.

Tung Oil Plants.—Out of the 76 tung oil seedlings originally planted only 23 are now surviving. A few of them have grown very well.

Short Course on Spraying and Grafting.—Such a course is held twice in the year a few days before actual spraying Operations are expected to begin in estates so as to fit and enable the men to do satisfactory work when they return to their estates. This course is attracting attention of all the planters who are undertaking to spray and hence we are receiving men for training both within our State and outside it. During the year under report 21 estate writers and five maistries have been trained.

Crop Yield.—A total of 15 tons, 1 cwt. 3 qrs. and 2 lbs. of coffee was got of which 12 tons were made into parchment and the rest into cherry or Native. The net amount of Rs. 13,400 approximately was realised after meeting transporting, curing and other incidental charges.

Visitors.—91 planters visited the Station during the year.

Programme for Future Work.—Experimental works that are under investigation and progress will be continued.

(Sd.) Y. R. NARAYANA RAO,
Farm Manager.

K. H. SRINIVASAN,
Assistant Director of Agriculture,
Chikmagalur Circle.

BRIEF REPORT OF WORK DONE AT THE GOVERNMENT EXPERIMENTAL COFFEE FARM, BALEHONNUR, DURING THE YEAR 1932-33.

Administration.—Mr. Y. R. Narayana Rao was confirmed as Manager of the Farm during the year and Mr. Venkatesiah was appointed Plant Breeding Inspector.

The health of the station has been fair and satisfactory. There was a total rainfall of 108.74 inches and the prospects for the coming year are good.

Experiments on Coffee manuring, spraying and breeding is progressing very satisfactorily.

Valuable results on manuring of coffee have been obtained which do indicate the way in which manuring has to be done in order to obtain good results. But conclusive results will not be available for some time to come.

Spraying experiments have given us sufficiently significant results. Spraying twice a year is decidedly to be favoured to spraying once a year only either before the monsoon or after the monsoon rains. Half strength Bordeaux has been found to be quite sufficient to check the coffee diseases but under special circumstances full strength is recommended. This determination of the proper time of spraying and the proper strength has not only shown the way for economy and greater gains but also have shown the way for an effective check against diseases. Various adhesives have been tested of which casein and linseed stand well. The success of linseed oil as an adhesive has lead to the trial of various locally produced oils such as Hongey, Gingelly and Ground-nut oil.

Among the spraying outfits tried during the year, Drake and Fletcher power Sprayer with six lines of hoses, is found very satisfactory both as regards the quality of work and working costs.

Our Plant Breeding work has progressed one step further during the year under report. The F_2 generation coffee seedlings have been selfed and a good number of seeds are expected. Work on the usual lines is progressing in the matter of selfing or cross breeding of desirable types of selections of coffee plants. Plant propagation by means of grafts in the nursery and in the estate patches is being carried on as in previous years. Suckers are being laid in beds to test their growth, etc. Some two year old grafts are bearing and further observations on the merits of grafting will be made in the coming year.

From the experiments conducted so far in regard to preservation of Nursery Bamboo basket it was found that four per cent Copper Sulphate solution would be quite enough to preserve the baskets in tact for over ten months or even more.

Important commercial types of cardamom varieties have come to bearing. Breeding of these varieties will be taken up this year. Manuring of cardamom has been started.

The Coffee Station undertakes to train Planters' men in spraying and grafting and for this purpose two courses are being held in the year. It is gratifying to state that there is good response shown by the Planters. Last year 21 Estate Writers and five Maistries were trained on the Farm.

The yield of crop on the Station shows steady improvement and this for the most part is attributable to the beneficial effect of spraying and timely works.

A total of 15 tons, 1 cwt. 3 qrs. and 2 lbs. of coffee was produced and a net amount of Rs. 13,400 was realised thereon.

(Sd.) Y. R. NARAYANA RAO,
Farm Manager.

K. H. SRINIVASAN,
Assistant Director of Agriculture, Chikmagalur.

ANNUAL REPORT OF THE SHIMOGA CIRCLE FOR THE YEAR 1932-33.

Charge.—During the year under report the following Officers were in charge of this Circle as noted below :—

Mr. C. Ellappachetty up to 27th October 1932.
Mr. K. H. Srinivasan up to 26th November 1932.
Mr. A. K. Yegnanarayana Aiyar, up to 12th January 1933.
Mr. K. H. Srinivasan up to 4th May 1933.

Leave.—I assumed the charge of the Circle on 4th May 1933. Mr. A. K. Yegnanarayana Aiyar, Deputy Director of Agriculture, was on combined leave from 27th May 1932 to 25th November 1932, during which period Mr. C. Ellappachetty, Assistant Director of Agriculture, was in charge of this Circle till 27th October 1932.

Mr. K. H. Srinivasan, Assistant Director of Agriculture, Chikmagalur, was in charge of the Circle also in addition to his own duties.

Mr. C. Ellappachetty, Assistant Director of Agriculture, went on leave from 27th October 1932.

Transfers.—Mr. A. K. Yegnanarayana Aiyar, Deputy Director of Agriculture, was transferred to Bangalore, as Headquarter Deputy Director of Agriculture, Bangalore.

Mr. N. Ramanna, Agricultural Inspector, Hassan was transferred to Hebbal Agricultural School.

Mr. Abid Hussein, Agricultural Inspector, Marthur Farm was transferred to Babbur.

Mr. K. A. Krishnan, Farm Manager, Marthur, to Kolar.

Mr. C. B. Krishnamurthi, Head Master, Hassan Agricultural School, is on special duty for conducting the Economic enquiry into the cost of production of crops inaugurated by the Imperial Council of Agricultural Research.

Mr. G. S. Rangaswamiengar, Agricultural Inspector, Hiriyur, was transferred to Mandya Circle.

Mr. K. H. Balaji Rao, Agricultural Inspector, Shikarpur, was transferred to Hiriyur.

Mr. M. Vasudevamurthi, Agricultural Inspector, Holalkere, was transferred to Hassan Agricultural School.

Leave.—The following Agricultural Inspectors were on leave for periods noted against each :—

Mr. B. R. Gopala Rao, 11th October 1932, to 4th February 1933.
Mr. B. R. Gopala Rao, 25th June 1933.
Mr. S. V. Haridas, 2nd January 1933, to 11th January 1933.
Mr. C. Pranesha Rao, 2nd November 1932, to 8th November 1932.
Mr. M. Vasudevamurthi, 23rd April 1933, to 22nd May 1933.

Tour.—I was on tour for 30 days. The several Agricultural Inspectors of the Circle were on tour as noted below :—

Range	Days
Shimoga	197
Shikarpur	187
Sagar	196
Tirthahalli	184
Hassan	152
HoleNarsipur	181
Arsikere	196

Range	Days
Chitaldrug	82
Hiriyur	164
Davangere	177
Holalkere	158
Challakere	144

Library.—Only two books have been added to the library during the year. Special grant to equip the library with reference books, is necessary.

Correspondence work.—The number of letters received and sent out during the year under report is given below :—

Letters received	10,962
Letters despatched	11,240

Season.

Shimoga District.—Rain-fall ringdu the year was one of excesses both during South-west and North-east Monsoons. Early showers helped both preparatory cultivation and sowing. It is reported that in some parts of Shimoga Range the rain was rather incessant at the time of sowing which resulted in late sowing of dry crops. Rain interfered during the harvesting season and affected the yield adversely. Second spraying of some areca gardens where Koleroga was persisting, was not possible owing to heavy rains.

Hassan District.—Rain-fall was not only much in excess of last year but was also unfavourably distributed in some parts of the District. In Arsikere and in some parts of Channarayapatna Taluk, the early showers and rains during the sowing season were not only untimely but scanty, resulting in late sowing. In other parts of the District the premonsoonic showers were favourable but the rains held of after sowings and consequently Kar Ragi and other dry crops suffered in growth. In Hole-Narsipur Taluk Kar Ragi was transplanted rather late. Latter part of South-west and North-east Monsoons were as heavy as in other Districts. These heavy rains affected the standing dry crop very adversely and also impeded harvesting. Thus the dry crops suffered both in early and later stages of their growth, with the result, that the yield on the whole was far from satisfactory.

Chitaldrug District.—It is reported that the rain-fall and its distribution was on the whole quite satisfactory and it was of course in excess of last year. Especially for Hiriyur Taluk which usually suffered most from drought, this year has been one of exceptional bounty, but it deplorably affected Mungar Jola, Ragi and Pulses. Seasonal conditions for cotton were reported to be favourable in almost all parts of the cotton area and good crops had been obtained. On the whole seasonal conditions in this Circle may be said to be favourable during the year though the dry land crop were rather badly affected in certain parts owing to heavy rains.

Consuming power of market continued to be bad if not worse, though slight improvement was noticeable here and there. Ability of the raiyats to invest money on the improvement of land and cultivation has naturally been poor.

The District work of the Circle continued on the same lines as in previous years and principle once are referred to below.

Popularisation and sale of implements and other Agricultural Appliances.

Demonstrations have been held as usual to the extent the funds permitted. In all, 111 demonstrations mostly plowing with improved plows were held against 165 in the previous year.

Sale of implements was considerably affected by the poor purchasing power of the raiyat due to slump in the market. However it is encouraging that the total sales of plows and cultivators are more than last year (251 as against 154 last year)—2,020 spare parts were also sold. In addition to the sale of implements and spares through the Department, a fairly large number of plows, Sugar-cane mills and spares were sold by private agencies in Chitaldrug and Davangere. In the latter place alone the total value of Agricultural Implements sold amounts to Rs. 5,000.

The Implement sales during the year were as below :—

	K. M. plows	K. M. cultivators	Kirloskar plows	Eureka plows	Meston plows	Gardener's plows	Mysore plows	New Mysore pattern plows	K. M. pattern plows	Shares and other spares	Sugar-cane mills	Malnad plows	Stone rollers
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Shimoga	1	2	..	8	..	8	..	4	9	576	9	..	..
Sagar	..	..	..	..	20	..	..	..	..	53	4	..	..
Shikarpur	..	..	2	..	..	..	..	..	..	57	5	..	..
Tirthahalli	..	1	..	2	39	..	..	..	4	219	1	1	..
Hassan	2	6	..	18	..	..	..	..	..	345	2	..	240
Arsikere	..	15	..	7	..	..	..	..	47	102	..	..	..
Hole-Narsipur	..	2	..	7	..	..	..	..	..	33	..	..	..
Chitaldrug	..	..	4	..	..	..	..	..	..	87	1	1	..
Davangere	..	1	13	..	..	..	..	1	3	359	..	..	..
Hiriyur	..	..	..	..	..	..	..	..	..	61	1	..	..
Holalkere	..	1	1	1	..	..	1	3	..	..	..	..	..
Challakere	..	..	7	1	..	..	..	..	..	119	..	..	..
Total ..	3	28	27	44	59	8	1	8	63	2,020	23	2	240

Sugar-cane Mills.—Madurai mills continue to be popular, 23 mills were sold during the year as against 33 in the last year. Sale by private agencies is reported to have been decreased also to a great extent. Only 8 Kirloskar Karanath mills were sold during the year. There has been no sale of mills manufactured by the Bangalore Engineering Company.

It is reported that some cheap mills are manufactured in Chennarayapatna, and twelve such mills were sold. A set comprising of one pan and a mill is sold for Rs. 120.

None of the Co-operative Societies and Village Panchayets have gone in for sugar-cane mills this year. The power crushing outfit owned by a Sowcar at Jamboor, Channarayapatna Taluk, is reported to be working satisfactorily.

Tractor ploughing.—No information is available regarding the development of this line of activity. It was reported in the report of the Conference for 1930-31, that crude oil tractors were in use in Bombay Presidency and the cost of fuel oil was only Rs. 1-8-0 per acre. An outfit of this kind is worth trying by the Department.

Manures.—The District staff, as usual, explained to the raiyats better methods of collecting and preserving cattle manure, and eight model manure pits were constructed. Use of green manure, groundnut oilcake as manure for paddy, sugar-cane, plantains, etc., is increasing. Cocoanut garden owners in Arsikere Taluk are steadily taking up to green manuring of cocoanut with sunnhemp.

Artificial fertilizers for garden, wet and even for dry crops have been used though not to such an extent as in the previous years. The fall in the use of artificials may mainly be attributed to depressed financial conditions of the cultivators. The figures given below indicate only sales in Departmental Depots. A fairly large quantity of fertilisers has passed through private agencies. In Davangere the total value of sale of artificials effected through private agencies amounts to Rs. 12,149 during the year. Complaints have been received that these private agencies neither stock sufficient quantities nor supply in time, and some of them put up the price as they like. Artificial fertilisers were distributed in small quantities for trial in small plots on different kinds of crops.

Results of some of the experiments conducted in 1932-33, are given as hereunder : Mr. Hiriyannagowda of Untoor has tried artificial fertilisers this year, as per Departmental instructions, on 1½ acre of areca garden. The yield from this particular strip is said to be fairly uniform for some years averaging to 60 maunds.

Statement showing the sale of manures.

Ranges	Oil cake	Ammonium Sulphate	Super Phosphate	Ammophos	Nicifos	Sulphate of Potash
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Shimoga	..	18,860	1,344	..	600	..
Sagar	..	..	..	1,500	..	112
Shikarpur	..	..	..	..	..	..
Tirthahalli	..	2,087	2,487	..	..	850
Hassan	..	52,920	16,800	5,992	..	..
Hole-Narsipur ..	..	4,284	4,256	130	588	..
Davangere	..	26,315	..	1,33,465	52,584	..
Hiriyur	1,008	784	448	..	..	..
Chellakere	..	160	84	2,016	..	..

Sugar-cane.— In every cane area of importance, the extension of area under new varieties is notable and have almost replaced the local canes. The most popular new varieties grown in this Circle are H.M. 320, H.M. 544, H.M. 553 J. 33 A and H.M. 602, and all of them have been well established. Still a good deal of effort seems to be necessary to introduce the new varieties in the large sugar-cane tract of Shikarpur. A beginning was made two years ago to introduce the new varieties in the tract by opening up small seed areas; but the work has not developed satisfactorily. 6000 setts of H.M. 553 have been distributed through the Agricultural Inspector from canes obtained locally. Number of setts of different varieties of cane distributed during the year by the Agricultural Inspectors are as follows :—

Range	Variety	No. of Setts
Shimoga	H. M. 320 / Do 544	39,500
Shikarpur	Do 553	6,000
Hassan	Java	1,50,000
	H. M. 320	29,000
	Do 553	42,600
	Babbur striped	12,300
	H. M. 602	4,000
	Do 544	5,000
Sagar	H. M. 544 / Do 553 / Do 320	6,500
Arsikere	H. M. 320 / Do 544 / Do 602	45,000
Hole-Narsipur	H. M. 553	14,000
	Do 544	5,000
	Do 320	24,000
Davangere	H. M. 320	2,96,700
	Do 544	1,55,000
	Do 553	52,000
	Do 602	38,600

Besides these, a large number of setts were distributed by mutual arrangements between growers.

Paddy.—Very notable extension of area under G.E.B. 24 has taken place. This variety has established very well both in Maidan and Malnad areas. It is reported that the variety is getting mixed up. Demand for pure seed has been very great from every range, and the Government Farms were not able to cope up with the demand. Wherever pure seed was available it was distributed to neighbouring villages by private negotiations to avoid heavy cost of transport. I wish to point out that price of seed paddy as well as other seeds supplied by the farms is high and it swells up and becomes prohibitive by the time they reach the raiyat. To avoid deterioration of

the variety and for the supply of pure seed at cheap rate in time I should think it necessary to open up seed farms in every range on the lines of Ragi and cotton seed Farms.

Other new varieties of paddy tried in the Districts on the recommendation of the Department are S. 12, P.S. 49 and Kolamba. The first two are being newly tried in Hassan and Hole-Narsipur Ranges. Kolamba is introduced in Sagar, Tirthahalli and Arsikere Taluks. Agricultural Inspector Tirthahalli reports that Kolamba variety being a short duration crop matures earlier than the other varieties grown in the same season but suffers most by ravage of birds. Quantity of seed of all paddy varietities distributed is given below :—

Range	Variety	Quantity Seers.
Shimoga	G. E. B. 24	1,100
Sagar	Do	963
Shikarpur	Do	400
Tirthahalli	Kolamba paddy	27½
	G. E. B. 24	50
Hassan	Chintamani Sanna	698
	S. 12	60
	3 months paddy	125
Arsikere	Chintamani Sanna	900
	G. E. B. 24	200
	Kolamba	80
	Yelandur Sanna	5
	Banku	6
Hole-Narsipur	G. E. B. 24	800
	Chintamani Sanna	48
	S. 12 paddy	52
	P. S. 49 paddy	81
	3 months paddy	18
Davangere	Chintamani Sanna	800
Holalkere	Do	105½
Chellakere	G. E. B. 24	156
	Bhangarthige	75

Ragi.—The area under H. 22 Ragi is increasing. The demand for pure seed this season has been great owing to poor yield in last season. The seed farms of H. 22 in Arsikere continued their work. During the year. 160 seers of seed got from Kunigal Range were distibuted to 6 "A Farms;" about 10 pallas "B. Farms;" seed were purchased and distributed to 50 B. Farms, and only 3 of them returned 6½ pallas of seed. It is reported that seed produced in Channarayapatna Taluk was not fit for sowing as it was damaged by rain. During this season 1,225 seers of H. 22 seed have been purchased in addition to 200 seers got from Hebbal Farm—distribution of seed has already been taken up. "C" types of ragi from Botanical Section were tried in Shimoga range but failed owing to heavy rains. Results of different strains of irrigated ragi Kar Ragi, tested in Chellakere and Davangere Ranges, are given in the statement enclosed. (S. II : No. I).

Distribution of Ragi in the Ranges, is noted below :—

Range	Variety	Quantity Seers.
Shimoga	H. 22	166
	H. 2	66
Shikarpur	H. 22	24
	H. 2	10
Hassan	H. 2	593
	H. 22	100
	K. 1	3
	C.	16
Arsikere	H. 22	2,765

Range	Variety.	Quantity.
Chitaldrug	H. 22	4
Hiriyur	H. 22	4½
	H. 2	4½
Holalkere	H 22	100
	H. 2	300
Davangere	H. 22	458
	C.	50

Ground-nut.—In many parts of the Circle, Spanish is the common variety grown. For the past two years distribution of H.G.I. variety on a large scale has been taken up chiefly in Chitaldrug and Shimoga Districts. It is reported that H.G.I. is not esteemed much in Davangere Range and the yield is not uniformly good. However a client in Davangere Taluk was successful in getting a yield of about 17 pallas to the acre. The Agricultural Inspector, Shimoga reports that this variety matures a couple of weeks later than the Spanish ground-nut.

Range	Variety	Quantity
Shimoga	.. H. G. I.	241 srs.
Hassan	.. Spanish Ground-nut ..	10¾ maunds.
Arsikere	.. H. G. I.	1,500 srs.
Davangere	.. Do	1,534 lbs.
Shikarpur	.. Do	500 srs.

Cotton.—Work in connection with the extension of area under S. 69 was continued on the same lines as in previous years. 4,242 maunds of seed were sold during the year as against 3,000 maunds last year. A large quantity of S. 69 seed popularly known as "Farm cotton seed" was sold through private agencies for seed purposes. It is reported that in areas where seed was obtained from private agencies and sown, the crop raised was a mixture. This strains has ousted out the local cotton in many parts. The lint fetches Rs. 4 to Rs. 5 more per candy of 500 lbs. than the ordinary Sannahatti.

The stock of seed was all purchased from Maradihally Co-operative Society. Establishment of sale Societies on the model of the above society in various parts of the District deserves consideration. These organisations will be of great help in controlling the seed market and to maintain the purity of the strain of cotton.

The Society obtained a loan of Rs. 10,000 from the Apex Bank as against Rs. 8,000 last year to carry on their business. Their sale proceeds during the year amounts to Rs. 27,225. Two hundred and fifty bales of lint of (400 lbs. each) were sold at rates ranging from Rs. 105 to Rs. 112 per bale. It is reported by the Agricultural Inspector, Davangere that S. 69 is ready for picking about two weeks later than the local Sannahatti. In Harihar Taluk, the Sannahatti (both local and S. 69,) is yielding place to Doddahatti, as it yields more and fetches better price.

In Molakalmuru Taluk, the area under S.69 has not extended chiefly because of H. 62—a strain of Hagari cotton that is said to be better yielding having higher ginning percentage—and Bellary market which is nearer to Molakalmuru favours this cotton.

M.A. IV cotton was tested in half a dozen places in Davangere Range and has not come up well. Arrangements have been made to test M.A. II and M.A. IV during this season.

In Arsikere M.A. II, M.A. IV 204-208 and M.A. IV 5 locks, were tried with local Hanorahalli cotton as control. Out of four experimental plots laid out in Chaluvanahally and Harathanahally only two were successful. M.A. II has stood first in both the experiments.

Details of Experiments are given in the statement enclosed. (Statement No. II.)

Pepper.—Malabar pepper varieties have fairly well established and there is increased demand every year for cuttings and layerings. Supply from Marthur Farm is very much limited. 799 cuttings and 224 basket layerings were distributed.

Areca-drier.—The improved areca driers are gaining popularity though slowly but steadily, as the initial out lay is rather high. Some of the big garden owners have

expressed that the present model is too small for their purpose, and they would like to have one of double the capacity of the present drier. Seven driers were constructed during the year.

Jola Steep.—The simple but effective remedial measure against Smut on Jola is very well appreciated and a good number of copper sulphate packets have been sold.

Silage.—It is encouraging to note the progress achieved every year in this line of work. Twenty Silo pits have been put down as against 39 in the previous year. The decrease in number is due to unfavourable seasonal conditions.

	Silo pits
Sagar	1
Tirthahalli	1
Hole-Narsipur	2
Davangere	16
Total ..	20

Breeding Bulls.—Distribution of breeding bulls to the Village Panchayets has not progressed to such an extent as it was anticipated when the work was taken up a couple of years ago, on account of economic depression. Only six bulls have been distributed in this Circle during the year. Of these one is from Cattle Breeding Station and the rest were distributed directly from the herds, through the efforts of the Amrut Mahal Daroga. All these are stationed in Arsikere Taluk Except one or two all the others are reported to be functioning satisfactorily.

Work through Co-operative Societies and Village Panchayets.

Work in this direction has not been so satisfactory as in the previous years on account of mainly depressed financial condition. Many of the Co-operative Societies are not stable enough to take up Agricultural Work for want of funds.

It will be seen from the statement enclosed (No. III) that Holalkere Range tops the list in the volume of work turned out through Co-operative Societies and Village Panchayets. Ploughs and spares to the value of Rs. 752 were sold in Holalkere.

District Boards.—Thanks to the District Boards of Shimoga and Hassan who have contributed Rs. 200 and Rs. 400 respectively towards the development of improved agriculture in thier Districts. It is with the help of these funds we were able to conduct demonstrations, construction of driers and Silos. The District Staff has as usual attended and taken part in various conferences, general meetings of Co-operative Societies and village panchayets, Jatras, etc., for propaganda purposes. Total sales in the Agricultural Range depots amounted to Rs. 16,097. I desire to express my appreciation of the good work turned out by the Agricultural Inspectors of this Circle, in spite of several adverse factors.

Details of transactions in Shimoga Circle for the year 1932-33.

No.	Range	Implements	Seeds and Manures
		Rs. a. p.	Rs. a. p.
1	Shimoga	2,594 7 6	299 9 6
2	Sagar	796 8 9	246 10 9
3	Shikarpur	171 13 0	131 8 0
4	Tirthahalli	727 11 9	485 5 1
5	Hassan	585 0 0	464 0 3
6	Arsikere	1,357 10 0	624 12 8
7	Hole-Narsipur	119 8 0	115 14 6
8	Chitaldrug	421 4 0	976 3 7
9	Davangere	953 3 0	665 7 9
10	Hiriyur	239 12 9	1,348 4 0
11	Holalkere	1,414 9 3	209 6 9
12	Challakere	383 9 0	765 3 6
	Total ..	9,765 1 0	6,332 6 4

C. NARSINGRAJU,
Offg. *Assistant Director.*

STATEMENT No. IV.

Work done through Co-operative Societies.

Shimoga Range.

Range	Village	Implements	Quantity	Amount
		Krishi Kalabhudaya Society.		Rs. a. p.
Shimoga ..	Channagiri ..	1 Kir. No. 9 share bolt and nuts ..	50	9 6 0
		2 Do spanner ..	21	9 3 0
		3 Do 15 ..	12	5 4 0
		4 Do 9 ..	53	76 3 0
		5 Do 15 bridle bolt nuts ..	124	6 0 0
		6 Do 11 share ..	25	32 13 0
		7 Do 15 do ..	25	34 6 0
		8 Do 9 bridle and nuts ..	24	7 8 0
		9 Do 11 share bolt and nuts	26	4 14 0
		10 Do , mould board ..	2	10 12 0
		11 Do 15 do ..	2	12 4 0
		Total ..	..	208 9 0

Range	Taluk	Implements	Amount
			Rs. a. p.
Tirthahalli ..	Tanginakere	Nine meston plows and 25 shares ..	69 12 0
	Melige	Implements worth	10 2 0
	Mandagadde ..	A M 2 S 04 and Supers worth ..	80 0 0
Chitaldrug ..	Jagalur	Kir 9 share 6, bolts 2 and nuts 2 ..	9 0 0
		S. 69 cotton seed 476 mds. ..	361 7 0
	Sondekola Adikarnataka C.S. ..	Kir. 11 share 1. Kir. 9, share cast iron spanner 1.	2 2 0
		Do spare bolts and nuts 2 ..	....
	Turuvanur	S. 69 cotton seed 89½ mds. ..	64 0 0
	Doddasiddavanahalli ..	Do 22 mds. and 101 lbs. ..	17 0 0
Holakere ..	Holakere Town ..	Plows and spares	605 7 6
	Sree Rampur	Do do	31 10 3
Challakere ..	Parasuramapur & Merasabihalli.	Do do	164 8 0
	Ramajogihalli and Obalapur ..	S. 69 cotton seed	300 0 0
		Total ..	1,923 9 9

Work done through the Village Panchayets.

Sagar ..	Somley ..	Nagar Taluk ..	G.E.B. 24. 170 seers	10 0 0
	Thodagalale ..	Sagar Taluk ..	2 Meston plows	9 12 0
	Sidur ..	Do ..	3 Do	9 12 0
	Gorgodu ..	Nagar Taluk ..	3 Do	14 10 0
	Talur ..	Sorab do ..	11 and Eureka points	53 10 0
	Anavatti ..	Do ..		
	Kodur ..	Nagar Taluk ..		

C. O. 97—12—0

			Rs. a. p.
		B.F. ..	97 12 0
Hassan ..	Doddakanagal ..	Village panchayet, Implements ..	15 13 0
Hole-Narsipur ..	Haradur ..	1 K. M. cultivator & 1. Eureka plow	26 7 0
	Gaddehosur ..	Do	14 3 0
	Hanagal ..	1 K.M.	31 11 0
		and 1. Eureka plow	
Davangere ..	Belludi ..	S. 69 cotton seed	49 14 0
	Doddabatthi ..	One Mysore pattern plow	14 4 0
	Bilasanur ..	S. 69	99 12 0
	Halivana ..	One Mysore pattern plow	14 4 0
	Rajanahalli ..	S. 69	49 12 0
	Neevalgi ..	One breeding bull	100 0 0
	Sayagali ..	S. 69	42 12 0
	Halebathi ..	K. M. pattern plow	14 4 0
Holalkere ..	Kainadu ..	Plow and Cultivator	40 6 0
	Adnur ..	Plow	15 0 0
	Paddikatte ..	Do	15 0 0
	Madderu ..	Do	30 2 0
	Hiriyur ..	Do	15 0 0
		Total ..	688 4 0

STATEMENT No. I.

Statement of Kar Ragi Varietal Experiments.—Davangere.

No.	Variety	Yield per plot of 5 guntas	Yield per acre
		Seers.	Seers.
1	C. 357	81½	652
2	C. 358	68½	548
3	C. 359	103½	828
4	C. 362	76	608
5	C. 363	58	468
6	C. 271	80	644
7	H. 22	97	776
8	Local	47	376

Statement of Ragi Variety Experiments.—Chellakere.

Variety	Plot of guntas	Yield grown	Yield per acre	Yield grown by local	Yield per acre
		Seers	Seers	Seers	Seers
H. 41 ..	4	20½	205	..	..
H. 42 ..	,,	15	150	30	300
K. 1 ..	6	152	1,013	112 (2 guntas plot.)	746
K. 2 ..	12	64	213	78	260

STATEMENT II.

Statement showing the yield of cotton at Harathanahalli Experimental plot.—Name of party.— Mr. Venkataramaiya.

Plot No.	Variety	13–11–32 I picking		25–11–32 II picking		10–12–32 III picking		15–1–33 IV picking		Total	
		lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.	lbs.	oz.
1	Local	0	12	2	8	3	0	1	4	7	8
2	M. A. IV 208	0	10	1	8	2	12	1	4	6	2
3	M. A. IV 5 locks	0	10	0	8	1	0	0	8	2	10
4	M. A. II	1	0	2	8	2	8	3	0	9	0
1—5	Local	1	0	2	4	3	4	1	0	7	8
2—6	M. A. IV 208	0	12	2	0	3	10	2	0	8	6
3—7	M. A. II	1	8	3	0	5	0	2	0	10	8
4—8	M. A. IV 5 locks	0	6	0	8	1	8	1	0	3	6
1—9	Local	1	0	3	0	3	0	2	8	9	8
2—10	M. A. IV 208	0	4	2	8	3	8	1	8	7	12
3—11	M. A. II	1	0	3	8	4	0	3	0	11	8
4—12	M. A. IV 5 locks	0	4	0	8	0	8	0	4	1	8
1—13	Local	0	8	1	8	2	12	1	0	5	12

Each plot of 2 guntas.

No.	Treatment	Total yield		Yield per acre	
1	Local	30	4	151	9
2	M.A. IV 208, 3 plots	22	4	147	8
3	Do II do	31	0	206	4
4	Do IV 5 locks	7	8	50	0

Soil-black. —

ANNUAL ADMINISTRATION REPORT OF CHIKMAGALUR CIRCLE, FOR THE YEAR 1932-33.

1. *Administration.*—The present jurisdiction consists of the whole of the Kadur District and the Revenue Sub-Division of Saklespur and Alur Sub-Taluk. I continued to be in charge of this division since the demise of Dr. M. K. Venkata Rao, who was the Deputy Director of Agriculture of this Circle.

Two Agricultural Inspectors and 4 fieldmen were transferred to maidan parts.

2. *Tours.*—I was on tour for 149 days in all during the year under report.

3. *Seasonal conditions.*—The pre-monsoon showers were on the whole favourable. Though the blossom showers for coffee were a bit early and came in light showers and at frequent intervals, no serious damage is apprehended. In some cases due to the nature of blossom showers, poor crop is the result while in others a fair crop is expected. Hence, taking all the coffee area into consideration, a normal crop is expected in spite of untimely rains. Tarikere received timely rains and consequently all the tanks in Tarikere area which had not had sufficient water during the past 3 or 4 years have received plenty of water and the tanks are full this year. The wet and dry crops have not suffered to any extent. Second sowing had to be done in a few places owing to too much of moisture, and incessent and early rains. Heavy down pours of rains during the year under report did not occur. There were no serious cattle diseases in the area. There was sufficient water and food for cattle.

Owing to general trade depression, coffee, arecanut and paddy have commanded low prices. Cardamom and pepper have also fared the same fate. Even at low prices paddy producers seem to have had considerable difficulty for the sale of their crops. The fortunes of coffee, cardamom and areca growers were on the whole favourable in spite of the trade depression. The Cardamom prices seem to be the lowest this year, as compared with those for the last 8 or 10 years. In spite of this, growers had a fair margin of profit. As trade depression and low prices have a tendency to influence the general outlook and policy of a griculturist, much improvement in agricultural practice cannot be hoped for until things take a turn to the better and markets revive. Good outturns in the main have helped the raiyats to tide over these difficulties.

4. *Demonstration work.*—Altogether over 200 demonstrations were held by the Agricultural Inspectors and the major work has been as hithertofore, the demonstration of spraying for coffee, use of improved ploughs and cultivators. The Agricultural Inspector in Koppa has been able to popularise three-tyned cultivator, which is very light in draught. The use of improved sugar-cane mill is becoming very popular in this area. In Tarikere Range ploughing demonstrations with Kolar Mission Plough and Kolar Type Plough were conducted and these ploughs are becoming popular.

5. *Manures.*—There has been a marked increase in the use of commercial fertilizers even for ordinary crops, and the indications are that these fertilizers are becoming more and more popular in coffee estates. Ammo-phos has been the favoured manure for paddy and Sulphate of Ammonia for Sugar-cane. Lately owing to high price for Ammo-phos this manure is not being advocated. Fertilising coffee according to the advice of our Department is gradually being persued by Planters with beneficial results. The Fertilizer trade is fast developing in Chikmagalur and the Agents who mainly supply to Indian Planters are having very lucrative business. However, much propaganda is still necessary in order to enlighten planter the right and correct way of manuring coffee in place of the haphazard mixture containing unbalanced and insufficient plant foods.

The use of sheep manure is strong with some of the Giri Planters. The uneconomic nature of applying such a manure is gradually dawning on the planters.

It is gathered from Agents and others that nearly 1,500 tons of manures are being utilised by coffee planters. Through our Departmental agency, about 40 to 50 tons of manures have been used for field crop by the raiyats.

The fertilisers supplied by the Department and other local firms (though our suggestions) are noted below :—

		Tons.	Lbs.
1.	Groundnut cake	27	392
2.	Artificial manures	7	..
3.	Ammonium Sulphate	8 bags	..
4.	Ammo-phos (20-20)	125 „	..
5.	Sulphate of Potash	26 maunds	16

6. *Seeds.*—The following quantities of seeds and sugar-cane setts were distributed.

Seeds :—

G. E. B. 24 Paddy	650 seers.
Chintamani sanna paddy	421 „
Ginger bulbs	6 maunds
Seed wheat	6 seers
H22 Ragi	270 „
Other varieties of ragi	24 „
M. A. I. Cotton seeds	7 lbs.
Combodia cotton seeds	54 „
Sunhemp seeds	183 seers
Coffee seeds	3 bushels.

Sugar-cane setts :—

H.M. 320	40,000 (single)
Babbur striped	25,000
H.M. 533	4,500
Other improved varieties	8,000

Since the varieties of Java, H.M. 544, Babbur striped, H.M. 602, H.M. 553 had already been introduced in the area, this year 40,000 setts of H.M. 320 were distributed as a new variety in some parts. Besides, several kinds of vegetable seeds were sold to the public.

7. *Agricultural Methods.*—Under this head the following work has been done by the cultivators in the area and also advocated by the staff.

1. Economic transplantation of paddy.
2. Planting of sugar-cane setts in furrows.
3. Manuring of paddy, coffee, areca, cardamom and planting distances, etc.
4. Improved technique in sugar-cane milling and manufacture of jaggory including the use of ladles for skimming and litmus paper for testing.
5. Ear-head selection of paddy and other grains for seed purposes.
6. Ploughing of dry land after harvest.
7. Use of stone roller for threshing.
8. Introduction of cochineal insect in parts of Ajjampur and Yagati for eradicating of cactus.
9. Spraying against coffee diseases.

8. *Future Programme.*—The abovementioned items of work will be persued in future also.

9. *Sales.*—The following implements have been sold for the period under report:—

1.	Mysore Ploughs	2
2.	Kirloskar Plough No. 100	1
3.	Do No. 9	1
4.	C. I. W. Ploughs	2
5.	K. M. Cultivators	11
6.	Meston Ploughs	6
7.	Madhurai Mills	2
8.	Mould Board	1
9.	Land side	1
10.	Jaggory mould board	1
11.	Eureka Ploughs	17
12.	Shares	109
13.	Points	17
14.	Bolts and Nuts	25
15.	Sieves	2

All these are valued at Rs. 1,270-13-0.

Sale of Chemicals.—

Particulars.	Tons.	Cwt.	Lbs.	Value. Rs.	a.	p.
1. Copper Sulphate	39	16	3	17,148	2	0
2. Casein	19	18	62	7,711	13	0
3. Lime Tins	2,538 tins			3,775	5	6
4. Soda	..	..	252	19	8	0
5. Fish Oil Soap	..	..	641	207	3	0
6. Spare parts	..	..	..	2,671	6	11
7. Resein	..	..	339	42	6	0
8. Sprayers :—						
1 gallon (No.) 25				600	0	0
2 gallons „ 288				10,369	8	0
Total ..				42,545	4	5

A sum of Rs. 328-2-8 has been realised in the Depots under seeds and manures during the year.

The total sale this year under all heads amounts to Rs. 44,144 against Rs. 37,539 in the previous year.

10. *Co-operative Extension Work.*—It has been possible for the undermentioned Co-operative Societies to take up Agricultural work as indicated below :—

1. Sree Venugopalaswamy Co-operative Society, Amble.	Manure	400	0 0
2. Hiremagalur Co-operative Society ..	1 Eureka Plough 1 K. M. Cultivator	30	0 0
3. Aradavalli Society	1 Eureka Plough	14	14 0
		444	14 0

4. Kattemane 5. Hosagodu 6. Narve 7. Kigga 8. Aldur 9. Balehonnur 10. Bikli and 11. Sollebile.	Owing to financial stress, these Co-operative Societies have purchased small quantities of improved seeds and manure for sale to raiyats.

The undermentioned Village Panchayets have come forward for Agricultural Co-operative work during the year under report :—

1. Eswarahalli Village Panchayet ..	.. 2 Eureka Ploughs.
2. Koppa Village Panchayet ..	.. 1 Madhurai Mill and a pan.
3. Hirekodige Panchayet ..	.. 1 Eureka and 1 K.M. Plough.
4. Thenginamane Panchayet ..	.. 1 Eureka Plough.
5. Somalapur Panchayet ..	.. 1 do
6. Bilvagalu Panchayet ..	.. 1 do
7. Handur Panchayet ..	.. 3 Meston Ploughs and 5 Eureka Ploughs.
8. Muthina Koppa Panchayet ..	.. 3 Meston Ploughs.
9. Narve Narasapur Panchayet ..	.. 1 Meston Plough.
10. Kesva Panchayet ..	.. 1 do
11. Hirnallur Panchayet ..	.. 2 Kirloskar No. 100 ploughs.
12. Kumberhalli Panchayet ..	.. 2 Kirloskar NO. 100 ploughs.
13. Mallenhalli Panchayet ..	.. 1 Breeding bull from the Cattle Breeding Station.
14. Amritapura Panchayet ..	.. 1 do do

Besides, six Village Panchayets own breeding bulls supplied by the Cattle Breeding Station, Ajjampur in the Tarikere area alone.

11. *Spraying against Coffee Diseases.*—Leaf disease, black-rot and die-back are the chief diseases that attack coffee. Spraying with Bordeaux in order to lessen the havoc of these diseases is being advocated by the staff of this Circle. In coffee estates where spraying has not at all been known and where similar diseases do exist, the staff are doing spraying demonstration in order to convince the planters and show them the

difference between the sprayed and unsprayed blocks. Many coffee planters who hold small or big areas have made it a point to spray coffee as an important and routine estate work.

An attempt is made to collect statistics of the area of coffee under spraying by circulating printed reply cards. It is regretable to state that most of the planters have not yet responded to our request as a result of which it has not beec possible to give correct figures. However, the figures furnished by the Agricultural Inspectors are noted below. It is probable that the area under spraying far exceeds the one now furnished below for the reason that small areas of Coffee have not been taken into account. It is believed that there is an increase of nearly five to eight thousand areas sprayed coffee during the year under report.

Chikmagalur and Mudigere	..	7,024 acres
Saklespur	..	7,765 ,,
Tarikere	..	1,500 ,,
Koppa	..	2,033 ,,
Total	..	18,322 ,,

When the area to be sprayed is large, planters are advised to go in for hose type of sprayers (D.S.P.) so that they could spray the estate in quicker time and also economise in the working costs. The demand for these pumps was large and as many as 80 pumps were supplied to various planters. The value of these pumps comes to about Rs. 35,000. This heavy demand for pumps of a larger out-put marks the turning point in the history of Coffee Spraying for the better. It could be safely said that we have got over the demonstration stage now. The number of individual planters taking up spraying is steadily increasing while the total area sprayed is estimated to be more than 20,000 acres. I should say that this figure is only a conservative estimate based on the reports of the Agricultural Inspectors. Moreover, the staff of this Circle have undergone a short course of special study on coffee spraying and to know the working details of the several kinds of sprayers working on the Coffee Experimental Station at Balehonnur. This course has enabled them to explain the correct method of preparing the mixture and mechanism and working details of sprayers on the Estates.

12. *General.*—The work of the Agricultural Inspectors has been increasing on account of the demonstration work of spraying and sale of chemicals and the need of additional staff of Fieldmen is keenly felt especially in times of stress like the coffee spraying season ,when help can only be given to a few on account of paucity of staff.

K. H. SRINIVASAN,
Assistant Director of Agriculture,
Chikmagalur Circle.

BRIEF REPORT OF WORK DONE IN CHIKMAGALUR CIRCLE, FOR THE YEAR 1932-33.

1. *Administration.*—I continued to be in charge of this Circle and the Government Coffee Experimental Station is under the administrative control of this Divisional Office.

Two Agricultural Inspectors and four Fieldmen were transferred to maidan places.

2. *Seasonal Conditions.*—The rain-fall has, on the whole, been favourable. The early and badly distributed 'blossom' showers did damage on some coffee estates where crops expected are poor. But taking the whole of the coffee area, the prospects are generally fair. Wet and dry crops did not suffer either from scanty or excess of rains.

There were no serious out-breaks of cattle diseases and cattle in general were healthy.

3. *Market Condition.*—Owing to general trade depression and slump in prices, raiyats growing field crops suffered more than coffee and areca planters. Pepper and cardamom also fetched low prices. Although the garden crop owners were better off than the field crop owners, yet the good out-turn obtained by the latter have helped them to tide over bad prices.

4. *Demonstration Work.*—More than 200 demonstrations of spraying, ploughing, and jaggory boiling, etc., have been held in various places. As a result, improved ploughs, three tyned cultivators and sugar cane mills are being owned by Raiyats, Co-operative Societies and Village Panchayets.

5. *Manures.*—Manuring of coffee, cardamom and sugar-cane is being greatly taken up and a rational manuring system is taking the place of uneconomic and haphazard manuring of crops as hitherto practiced by most of the planters and raiyats. It is very difficult to guess even an approximate quantity of manures used in coffee estates, but one firm alone in Chikmagalur has supplied to coffee estates about 300 tons of manures. Through Departmental agency about 40 to 50 tons of manures have been supplied to the raiyats for filed crops.

6. *Seed Distribution.*—In the matter of improved variety of seeds H.M. 320 cane has been introduced and 40,000 setts have been distributed free of cost. Seeds of H.M. 544, H.M. 553, H.M. 602, Babbur striped and Java are available locally and raiyats buy their requirements direct. Paddy and ragi seeds are also supplied but in these cases much of the work is done in arranging local distribution from available sources. Good quality of coffee seeds for planting purposes have also been supplied both in and outside the State.

7. *Sales.*—Implements to the value of about Rs. 1,300 and sprayers and chemicals, seeds and manures aggregating to Rs. 42,600 approximately were sold during the year under report as against Rs. 37,539 during the last year.

8. *Agricultural Extension work through Co-operative Societies and Village Panchayets.*—Nine Co-operative Societies have taken up the stocking and sale of improved seeds and manures, and one society has taken up the sale of improved implements.

Twleve Village Panchayets have purchased implements, such as ploughs and cultivators or sugar-cane mill. Two Panchayets have purchased breeding bulls.

9. *Spraying Propaganda and Progress of Spraying.*—Demonstration on spraying and the facility afforded by Depots in stocking sprayers and chemicals have furthered the spraying propaganda.

As a result of experiments conducted on the Coffee Experimental Station the hose type of sprayers are beginning to replace hand sprayers except on small estates. About 80 such pumps (D.S.P.) were arranged for supply to planters through the Firm dealing with these machines. The total value of these machines comes to nearly Rs. 35,000. All the Agricultural Inspectors and Fieldmen of this Division were given training on

the Coffee Farm not only to repair sprayers but also to equip themselves with all the necessary information on spraying and spraying machinery.

I am gald to say that we have got over the demonstration stage and people are beginning to realise the importance of spraying on coffee and are coming forward to take up spraying. From the information received from the Agricultural Inspectors, it is made out that about 20,000 acres of coffee have been sprayed during the year which represent an increase of over 5 to 8 thousand acres.

10. *Future Programme.*—The agricultural methods hitherto advocated will be pursued in future also. Sufficient efforts will be taken to popularise spraying on coffee estates.

K. H. SRINIVASAN,
Assistant Director of Agriculture,
Chikmagalur Circle.

ANNUAL ADMINISTRATION REPORT OF THE MYSORE CIRCLE, FOR THE YEAR 1932-33.

1. *Charge.*—Mr. K. M. Gururaja Rao was in charge of this circle till 23rd January 1933, when I assumed charge, consequent on the transfer of the former to Mandya Circle.

The year under report witnessed remarkable changes in the powers and original constitution of this circle. Owing to the proposed scheme of establishing a Sugar Factory at Mandya, a separate Assistant Director was appointed for the Mandya Circle with Headquarters at Mandya, vested with powers of supervision, direction and control over the 3 Taluks of Mandya, Maddur, Malvalli and the Sub-Taluk of French-Rocks with a view to greater attention being paid for the growing of sugar-cane in these areas, where better irrigational facilities have been provided. The incorporation of these Taluks to the Mandya Circle, has slightly altered the jurisdiction of the originally constituted ranges of this circle from 10 to 8 in number, the details of which are as follows :—

		Original Jurisdiction	Present Jurisdiction.
1.	Mysore Range	Heggadadevankote	.. Mysore.
		Mysore and part of Seringapatam.	Krishnarajpete.
			Nagamangala and part of Seringapatam.
2.	Yedatore	Yedatore (Headquarters)	Periapatna.
		Periapatna.	Yedatore.
		Hunsur	.. Heggadadevankote.
			Hunsur (Headquarters).
3.	T.-Narsipur	T.-Narsipur	.. T.-Narsipur.
		Nanjangud	.. Nanjangud.
4.	Chamarajanagar	Chamarajanagar	.. Chamarajanagar.
		Yelandur	.. Yelandur.
		Gundlupet	.. Gundlupet.
5.	Nagamangala	Nagamangala	.. Since abolished and incorporated
		French-Rocks	.. in Mysore Range.
		Krishnarajpete.	
6.	Maddur	Maddur, Mandya and Malavalli	Now under the control of the Assistant Director, Mandya.
7.	Bangalore	Bangalore	.. No change.
		Hoskote.	
		Anekal	..
8.	Channapatna	Channapatna	.. No change.
		Kankanhalli	..
9.	Magadi	Magadi	.. No change.
		Closepet	..
		Nelamangala	..
10.	Dodballapur	Dodballapur	.. No change.
		Devanahalli.	

Ramakrishna Krishi Sala, an Agricultural Institution, near Anekal and Jeevanarayanakatte Farm, in Mysore continued to belong to this circle's jurisdiction.

2. *Tours.*—My predecessor was on tour for 115 days and I toured for 105 days during the year, which in the aggregate comes to 220 days as against 183 days in the previous year. The comparative figures given below are the number of days on tour by the Agricultural Inspectors during the year as against in the previous year.

Range.	1931-32.	1932-33.
Mysore	128	132
Hunsur	149	148
T.-Narsipur	262	252
Chamarajnagar	155	168
Bangalore	168	204
Dodballapur	252	240
Magadi	208	211
Channapatna	213	219

3. *Leave.* No officer was on leave during the year under report.

4. *Transfers.*—Mr. H. Venkataramiah, Agricultural Inspector, was transferred from Cattle Breeding Station, Ajjampur to Dodballapur, and Mr. N. C. Madangopal to T.-Narasipur, consequent on the transfers of Messrs. B. Suryanarayana Rao and H. Shankaranarayana to Koppa and Ramakrishna Krishi Sala, respectively. Mr. K. Ramachandra Iyer, Head Master, Ramakrishna Krishi Sala, is transferred to Hessaraghatta Grass Farm. Mr. B. Srinivasa Iyengar, Agricultural Inspector has been transferred from Babbur Farm to Yedatore, as Mr. B. R. Gururaja Rao, Agricultural Inspector was kept under suspension. Mr. H. Lakshminarasimhiah assumed charge of the Chamarajanagar Range *vice* Mr. H. M. Subbiah, Agricultural Inspector, who was transferred to the Irwin Canal Area. Messrs. C. J. Madhwaraj and H. Seshagiri Prabhu, Agricultural Inspectors were transferred from this Circle to Mandya and Chikballapur, respectively.

5. *Additions to Library.*—"The open pan system of white sugar manufacture" by R. C. Shrivatsava, Esqr. B.Sc., was purchased at a cost of Rs. 3-15-0 during the year.

6. *Correspondence.*—

	1931-32	1932-33
No. of incoming letters	.. 8,525	6,607
No. of out going letters	.. 8,755	7,809

The method of correspondence is based on the improved system of office procedure which necessarily involves more scriptry work and as such is found to be unworkable here, owing to scanty staff sanctioned for this office.

7. *Office and Depot Inspections.*—My office was inspected by the Deputy Director at Headquarters, Bangalore on the 10th May 1933. I conducted the annual inspections of the following Depots and the Ramakrishna Krishi Sala.—

1. Mysore.
2. T.-Narsipur.
3. Nagamangala.
4. Chamarajanagar.
5. Bangalore.
6. Channapatna.
7. Magadi.
8. Dodballapur.
9. Ramakrishna Krishi Sala.
10. Hunsur.

No depot was left uninspected during the year under report.

8. *Seasonal Conditions.*—The seasonal conditions during the year under report were on the whole favourable. But heavy rainfall at the time of harvest of dry crops in the Bangalore District drenched the Ragi sheaves and consequently rendered the Ragi seed black and unfit for seed purposes in many places. Potatoes and Garlics also suffered to a great extent, owing to heavy Hingar Rains. All the tanks received good supply of water. The sugar-cane and paddy cultivations were largely taken up by the raiyats and the results were satisfactory. In the Mysore District, the timely setting in of Mungar Rains facilitated the showing of mungar Jola. But Kar-Ragi in some places of Mysore Taluk was a failure for want of adequate rains at the time of sowing and heavy rains at the time of flowering.

Implements.—Demonstrations in ploughting, cultivating, levelling and cane crushing, were conducted on the raiyats' own fields as usual. The efficacy of these improved implements has been very well recognised by the raiyat class, in the Bangalore and Anekal Taluks and in these areas no further demonstrations are deemed necessary as the raiyats of these parts are coming voluntarily for the purchase of the improved implements. This year, attention was mainly focussed on the popularisation of K. M. Type and Mysore Type Plough which were manufactured at the Central Industrial Workshop, Bangalore. The working of these ploughs is reported to be very satisfactory. It would be an encouragement for the raiyat if the value of these new type of ploughs is reduced to an uniform rate of Rs. 10 each, instead of Rs. 15-12-0 each, as is now fixed, since they still feel the cost of these improved implements rather very high.

Ploughing demonstrations fell from 255 in the previous year 1931-32 to 209 in the year 1932-33; and cultivating demonstrations from 87 to 73; but such of those

which did not require extra funds such as use of skimming laddle in the Jaggory boiling, seed selection and economic transplantation of paddy, etc., were conducted in many places as in previous years. The relative figures are embodied in the statements attached to this report.

Sale of Implements.—This year, attention was largely directed towards the introduction of the two new type ploughs referred to in the foregoing para 50, Mysore Type ploughs and 74 K.M. Type ploughs were sold. The sale of other implements is decidedly low during the year owing to the scarcity of ready money and the consequent low purchasing power of the raiyat.

Work in conjunction with Co-operative Societies and Village Panchayets.—This is becoming more and more popular, but with the varying success on account of the scarcity of money with the raiyats. This year, only 21 Co-operative Societies could take up Agricultural work as against 35 of the previous year, and did a transaction of Rs. 1,238-1-3 as against Rs. 5,849 of the previous year. The number of village panchayets canvassed also has fallen from 172 in 1931-32 to 80 in 1932-33; and the money transaction from Rs. 5,072 in 1931-32 to Rs. 2,585 in 1932-33. The details of the transaction with these local bodies are embodied in the statement attached.

Lift Irrigation under Electric Power.—Electricity as an agent for pumping water for irrigational purposes is assuming a lion's share of popularity in the improvement of Agriculture. About 14 pumps are reported to have been working at Channapatna and 7 at T.-Narsipur Ranges, and timely advice is being given by the local Agricultural Inspectors regarding the economic crops to be raised under irrigation. Enquiries for installing more number of power pumps are coming in and there is a general desire for the utilisation of power for water lifting which is unfortunately kept back for the present owing to the dullness of the money market and the prevailing trade slump.

Cultivation Method.—Seed selection by salt water process, economic transplantation of paddy, wider spacing in sugar-cane planting, rotation of crops and roguing of Ragi crop to avoid mixtures before harvest, are some of the main improvements advocated and ocular demonstrations were conducted wherever found necessary.

Manures.—Growing of green manure crops such as sunn hemp for wet crops was widely recommended. The method of conserving cattle manure in manure pits and the improtance of urine collections was also explained to the raiyats. The applications of oil cakes to supplement the Nitrogenous manure and also the use of Super to mitigate the harmful effects of applying heavy doses of only Ammonium Sulphate to cane crops have been advocated.

Artificial Manures.—The sales of these manures have considerably gone down owing to the depressing trade conditions. The demand for these is becoming less and less. Now it is largely being taken up by the raiyats for sugar-cane and paddy under the Takavi Loan in the Mysore Channel Area.

The scheme to apply artificial manures for paddy crops in the Mysore Channel tract on Takavi Loan basis was given effect to during this year also and the experiment was tried in Mysore, T.-Narasipur and Yedatore Taluks. The Scheme is substantially in the nature of a new departure, and is calculated to bring in good profits to the raiyats; and its continuance every year by the Government renders it more and more popular. The results of these experiments are embodied in the statement attached to this report.

Crops.—The area under sugar-cane is rapidly increasing in the Mysore District. Four lakhs and thirty thousand single setts of H.M. 602 and J. 33-A. were supplied this year from Kalale, a village near Nanjangud, for seed purposes to the Irwin Canal area. H.M. 320 is the main variety that is largely grown by the raiyats in view of its higher tonnage and good jaggory. In the Bangalore District also the area is quickly extending and almost everywhere the new varieties introduced by the department, are being grown. This year from Bangalore Range, about 3 lakhs of H.M. 544 and one lakh of H.M. 320 sugar-cane setts were supplied to Mandya for seed purposes.

Paddy.—G.E.B. 24 Paddy is becoming very popular everywhere owing to its increased yield and superiority in quality also.

Ground-nut.—H.G.I., Spanish and Small Japan are the main varieties that are largely being taken up for cultivation. Of these, H.G.I. is more popular than the other varieties owing to its heavy yield. As these are crops of short duration, they are grown extensively as a catch-crop to paddy in some places in T.-Narsipur and Hunsur Ranges.

Seed Ragi distribution work.—The area under 'A' and 'B' Farms of Ragi is rapidly increasing every year, particularly in the Bangalore District. It has covered an area of 528½ acres as against 358½ acres of the previous year. About 350 pallas (Both H. 22 and H. 40) of seed Ragi were distributed for seed purposes, during the year under report. The total quantity of seed distributed so far, through the Department and locally by the raiyats and Village Panchayets and Co-operative Societies is estimated to have occupied more than 10,000 acres in both the Districts. Both H. 22 and H. 40 Ragi have impressed the raiyat class very well in view of their heavy yield and drought resisting quality when compared with the local varieties. That there is a growing demand every year for the supply of these improved varieties, confirms the fact that the scheme launched out by the Department is a splendid success.

Cotton.—The field trial of Nadam and Nadam-like cotton varieites in T.-Narsipur Taluk is reported to be a failure except in one place and as such their relative merits could not be recorded definitely now. Further experiments seem necessary to bring home the superiority of Nadam-like over Nadam-cotton. The same experiments will be repeated next year also.

Ensilage.—The method of preserving green fodder in pits has been advocated and the raiyats are slowly taking up to this work. For want of adequate funds practical demonstrations could not be conducted. At Maradi estate near Bettahalsoor in Devanhalli Taluk, Jola was ensiled and the stuff was very well relished by the cattle.

Inspection of Estates and Villages.—During the year under review 1,962 estates and villages were inspected by me and by the Agricultural Inspectors of this Circle, as against 1,720 of the previous year. Necessary and timely advice was given on the spot on improved methods of Agriculture. In addition to the maintaining of 2 books to record advice on improved agriculture at Uttarahalli and Dodbidrakal, one more book is added on this year at Arjunahalli in Yedatore Taluk, in the estate of *Rajasevaparayana* B. Srinivasa Iyengar, B.A., B.L., Retired Financial Secretary and instructions recorded then and there. In this connection, I may mention that *Rajaseva-parayana* B. Srinivasa Iyengar, B.A., B.L., is helping a good deal to the raiyat class in the neighbourhood of his place by demonstrating improved methods of cultivation and growing money crops on improved methods and as such richly deserves the thanks of the Department for the same.

District Board Subvention.—No subventions are being recieved for the last two years from the District Board of either districts to conduct more demonstrations on the raiyats' own fields, and to supply new strains of seeds, etc., at concession rates. The assistance from such local bodies is quite essential, particularly in these days of financial stringency and it is earnestly hoped that the non-official members of the District Board of both Mysore and Bangalore who are the custodians of the raiyats' interests will sympathetically consider this aspect of the question favourably at least for the next year.

Number of Experiments Conducted.—Twenty-nine varietal and 25 manurial experiments as against 34 and 19 of the previous year were conducted during this year. These, again, involved extra cost; and owing to the inadequacy of funds, more number of experiments could not be undertaken. The results of experiments so far conducted have brought home to the raiyat class the relative advantages of the one over the other (*vide* statement enclosed).

Depot Transactions.—The comparative statement enclosed discloses the tremendous fall in the depot transactions. The total turn over this year is Rs. 12,076 as against Rs. 15,933 of the previous year. The fall is mainly attributed to the adverse economic conditions and also to the sale of cheap and inefficient improved ploughs made by private bodies in Bangalore District. For want of sufficient funds, raiyats had to give preference to purchase cheap ploughs although inefficient and not durable.

Insect Pests and Fungoid Diseases.—This year demonstrations against avare pod borers were conducted extensively over an area of more than 50 acres, as an experimental measure, the cost being met out from the department. The cultivators feel convinced of so cheap a method of destroying the borers. The potato crop affected with "Epilachna" in Dodballapur Taluk was sprayed on the advice of the Entomologist and the results were found satisfactory. The requisition of the Range Officers in the matter of this and other diseases reported, were promptly attended to by the Sectional officers, and the remedial measures suggested were timely and successful. Lastly, the

Cochineal insects introduced on prickly-pear bushes in the villages of Channapatna and Kankanhalli Taluks have produced remarkable results in destroying them.

Conclusion.—The work so far progressed in our view falls far short of our contemplated programme. This is mainly attributable to the fact of shrinkage in the ready money and the general trade slump, the ruling features at present.

Lastly, thanks of the department are due to the assistance rendered by the officers of the Revenue and the Co-operative Departments, in furthering the work of the Department.

S. H. BENNUR,
Assistant Director.

STATEMENT I.

Statement of demonstrations conducted in the several Ranges of the Mysore Circle during the year 1932-33 with comparative figures for the previous two years.

No.	Name of Demonstrations	Mysore and Nagamangala			Hunsur			T.-Narsipur			Chamarajanagar			Bangalore			Dodballapur			Magadi			Channapatna			Total		
		1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31
1	Ploughing ..	19	22	22	28	68	55	27	23	25	..	6	30	62	74	40	4	5	28	60	52	23	26	35	9	219	285	239
2	Cultivating ..	15	10	8	9	48	48	6	15	3	..	3	16	20	28	12	..	7	28	28	..	13	3	3	9	73	114	145
3	Jaggory Boiling	4	2	..	1	..	1	7	6	10	..	4	7	25	41	6	..	14	..	4	10	8	7	9	10	46	86	44
4	Sugar-cane crushing.	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	3	1	..
5	Stone Roller Threshing.	..	..	..	1	3	..	4	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	3	4

STATEMENT II.

A comparative statement of implements sold in the several Ranges of the Mysore Circle for the years 1932-33, 1931-32, and 1930-31.

No.	Name of Implements	Mysore and Nagamangala			Hunsur			T.Narsipur			Chamarajanagar			Bangalore			Channapatna			Magadi			Dodballapur			Total		
		1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31	1932-33	1931-32	1930-31
1	K.M. Ploughs ..	1	6	26	..	..	2	..	24	24	7	9	11	53	144	187	..	1	11	8	11	*72 of all types	5	16	45	74	211	37
2	K.M. Type Ploughs.	3	..	..	1	..	..	..	..	..	11	..	..	44	..	..	..	..	..	5	..	..	10	3	3	74	3	3
3	Mysore Ploughs	6	5	5	..	1	3	7	1	2	1	1	1	..	..	1	..	..	..	..	..	..	1	2	1	4	16	10
4	Mysore Type Ploughs.	5	..	..	3	..	..	2	..	..	5	..	..	23	..	..	..	..	..	..	..	..	12	..	..	50	..	..
5	Eureka Plough	26	11	11	20	13	41	1	9	11	..	6	1	..	1	1	1	4	1	..	..	3	1	3	18	47	42	72
6	K.M. Cultivators	15	16	21	17	12	24	4	22	13	3	6	9	4	5	7	1	3	26	3	16	21	18	3	32	65	83	15
7	Stone Rollers ..	14	3	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14	3	9
8	Nahan Mills ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	3	..	2	3	..
9	Seed drill ..	..	2	1	..	..	..	..	..	..	2	..	9	..	..	4	..	..	..	..	..	..	..	..	..	2	6	1
10	Other spare parts.	195	130	115	32	41	39	5	78	12	162	85	140	389	335	290	25	26	37	21	12	5	60	56	65	889	*763	*703
11	Chaff Cutter ..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..

STATEMENT III.

Statement showing the work done through the Co-operative Societies in the several Ranges of the Mysore Circle during 1932-33, as compared with two previous years.

No.	Name of Society	Nature of work done during 1932-33	Amount realised		
			1932-33	1931-32	1930-31
	Chamarajanagar Range.				
1	Adikarnataka Co-operative Society, Saragur.	Implements ..	11 6 0		
2	Co-operative Society, Venkatiana Chatra.		....	....	....
	Total ..		11 6 0	37 6 0	5,276 0 0
	Channapatna Range.				
3	Chikkamuduwadi, Kankanhalli ..	1 K.M. Cultivator ..	14 14 0	....	....
4	Adikarnataka Co-operative Society, Yelekeri.	320 Seers Ragi, one plough, one cultivator	46 14 0	....	....
5	Mukunda Co-operative Society ..	160 Seers Ragi	8 0 0	....	....
6	Adikaranataka Society, Mangalwarpet.	320 „	16 0 0	....	....
		Total ..	85 12 0	....	....
	Magadi Range.				
7	Lakshmipuram Co-operative Society.	215 Srs. H40 Ragi, .. 1,960 Srs. H22 Ragi, .. 2 ploughs	172 0 0	....	....
8	Thaganakuppe Bachanahatty Co-operative Society.	500 Srs. H22 Ragi ..	30 0 0	....	....
9	Thirumal Co-operative Society ..	160 do do ..	10 4 0	....	....
10	Jakkanahalli Co-operative Society	Sugar-cane mill was hired out.	....	....	....
11	Kulvanahalli Co-operative Society				
12	Hulikal Co-operative Society ..				
		Total 6 ..	212 4 0	12,251 5 0	12,330 0 0
	Bangalore Range.				
13	Hoskote Co-operative Society ..	Implements	702 7 0	....	....
14	Sri Lakshminilya, Anekal ..	Do	35 5 6	....	....
15	Gottigere Adikarnataka Colony ..	....	....	....	....
16	Attibele Co-operative Society ..	Seeds	65 9 0	....	....
		Total 4 ..	803 5 6	1,12,553 0 0	14,870 0 0
	T.-Narsipur Range.				
17	Sri Krishnarajendra Co-operative Society.	Implements, Mysore plough, .. Eureka „ Cultivator	51 12 0	....	....
18	Sosale Co-operative Society ..	Mysore plough .. Cultivator	29 3 0	....	....
		Total 2 ..	80 15 0	1,991 14 0	8,280 0 0
	Hunsur Range.				
19	Saragur Co-operative Society ..	Paddy seeds	35 14 9	....	....
20	Siddapur	Spare parts	4 1 9	....	....
21	Kittoor	Cotton seeds	4 6 3	....	....
		Total ..	344 6 9	116 7 1	18,625 0 0
		Grand Total ..	1,238 1 3	3,55,850 0 0	7,75,334 0 0

STATEMENT IV.

Statement of seeds supplied from the several Agricultural Depots in the Mysore Circle during 1932-33 as compared with 1931-32.

No.	Particulars	Mysore and Nagamangala		Hunsur		T.-Narsipur		Chamarajanagar		Bangalore		Channapatna		Magadi		Dodballapur		Total	
		1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33
1	Paddy	1,105	2,711	250	2,140	..	9	1,989	692	1,524	5,027½	1,000	100	450	584	20	200	6,338	2,404½
2	Ragi	2,459	3,311	779	1,823	..	980	110	33	36,629	26,563	526	40	23,636	8,012	2,980	1,947	67,110	42,809
3	Ground.nut	229	500	492	225	..	..	100	..	564	883	49	..	200	325	700	1.175	2,334	3,108
4	Sugar-cane	55,510	12.969	..	9,750	14,000	7,12,800	..	..	..	270	25,800	..	28,000	24,000	..	..	1,24,510	7,85,319
5	Cotton	141 lbs.	12	..	..	..	..	..	..	5	2	..	..	..	..	..	..	19	14
6	Jola	72	33	..	10	..	..	..	..	567	50	497	..	150	150	..	..	1,286	243
7	Green manure seeds ..	107½	15	..	160	..	..	..	..	346	62	184	402	..	..	..	200	637½	1,939
8	Vegetable seeds ..	Rs. 12		..	..	..	..	..	Value 13-3-1	..	50 srs. beans, and 72 mds. potatoes	..	..	..	..	..	..	..	..
9	Tobacco	4 Pkts.		..	..	12 Tolas		..	..	..	..	..	..	..	..	..	..	..	12 Tolas
10	Wheat	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

STATEMENT V.

Statement showing the sale of artificial manures and other manures in the several Ranges of the Mysore Circle, during **1932-33** as compared with previous year.

No.	Name of Range	Ammonium Sulphate in lbs.		Super Phosphate in lbs.		Ammophos in lbs.		Oil-cake in lbs.		Other artificial in lbs.		Remarks
		1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	1931-32	1932-33	
1	Mysore	..	1,165	..	2,729	..	..	..	504	..	394	
2	T.-Narsipur	911	400	896	1,220	..	500	..	4,48,000	1,800	300	
3	Hunsur* ..		56,000*			..	..	..	..	..	..	* About Rs. 1,305 worth of artificial manures reported to have been sold by private agencies during the year.
4	Chamarajanagar	..	5,744*	244	..	..	..	..	..	..	..	
5	Bangalore*	..	..	..	..	..	..	..	..	..	..	* About 500 tons of artificial manures have been sold by the Imperial Chemical Industries and Shaw Walace & Co.
6	Magadi	8,480	..	224	..	1,000	..	..	..	..	..	
7	Channapatna	12,000	26,000	..	1,200	2,000	..	..	..	..	..	
8	Dodballapur	..	40,000	..	3,360*	..	4,000	..	..	..	..	
	Total ..	21,391	1,79,309	1,364	8,509	3,000	4,500	..	4,48,504	1,800	694	

* Sold by local Distributors.

STATEMENT VI.

Statement showing the sale realisations of Implements, Seeds and Manures at the various Agricultural Depots in the Mysore Circle during 1932-33 as compared with the two previous years.

No.	Name of Range	Implements			Seeds and Manure			Miscellaneous			Total		
		1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33
1	Mysore	2,272	1,348	1,176	184	299	578	143	71	168	2,599	1,718	1,923
2	Hunsur	1,589	132	633	192	275	287	..	..	..	1,781	407	920
3	T.-Narsipur	1,777	1,388	213	189	112	..	..	..	..	1,966	1,500	213
4	Chamarajanagar	771	795	909	164	257	76	2	5	10	937	1,057	995
5	Bangalore	4,670	5,417	2,844	1,266	2,358	991	216	..	327	6,152	7,775	5,162
6	Channapatna	1,038	112	91	219	491	445	6	22	9	1,263	625	455
7	Dodballapur	1,517	1,227	960	166	148	353	..	..	..	1,683	1,375	1,313
8	Magadi	879	617	293	130	858	711	20	..	1	1,029	1,476	1,005
	Total ..	14,513	11,036	7,119	2,510	4,799	4,441	387	98	516	17,410	15,933	12,076

STATEMENT VII.

Statement of work done through Village Panchayets in the Mysore Circle during 1932-33 as compared with the previous two years.

No.	Name of Village Panchayet	Nature of work done	Value realised		
			1932-33	1931-32	1930-31
	Mysore Range.				
1	Udbur	1 Stone Roller			
		1 K. M. No. 9 Plough ..	54 8 0	....	....
		1 K. M. Cultivator ..			
2	Sinduvalli	2 Stone Rollers	37 0 0	....	....
3	Dodahalli	Do	36 0 0	....	....
4	Uttanahalli	1 Mysore Type Plough ..	32 2 0	....	....
		1 K. M. Cultivator ..			
5	Ramanahalli	3 Stone Rollers	51 12 0	....	....
6	Choranahalli	1 Mysore Type Plough ..	31 10 0	....	....
		1 K. M. Cultivator ..			
7	Aigarahalli	1 Mysore Type Plough ..			
		1 K. M. Cultivator ..	66 10 0	....	....
		2 Stone Rollers ..			
8	*Someswarapura*	2 Stone Rollers ..			
		1 K. M. Plough ..	65 2 0	....	....
		1 K. M. Cultivator ..			
9	Balenahalli	1 Mysore Plough ..	56 4 0	....	....
		3 Eureka Ploughs ..			
		Total ..	9—431 0 0	521 0	18—580 0 0
	Chamarajanagar Range.				
1	Venkatanna Chatra ..	2 K. M. F4. Steel shares ..	5 6 0	....	....
2	Ummathur	1 Mysore Plough ..			
		2 Do Bar Point ..	73 10 0	....	....
		1 K. M. No. 9 Plough ..			
3	Somawarpet	1 K. M. Patter Plough ..	18 2 0	....	....
		1 F6. Steel share ..			
4	Maisala	1 F6. Steel Share ..			
		2 K.M. Type Ploughs ..	61 3 0	....	....
		1 K.M. Cultivator ..			
5	Kiragsur	1 K. M. No. 9 Plough ..	26 1 0	....	....
		2 F4-Steel Shares ..			
6	Kodvinakatte hundi ..	1 K. M. Type Plough ..	15 0 0	....	....
		Total ..	6—199 6 0	10—357 0 0	8—387 0 0
	T.-Narsipur Range.				
1	Kaliyur	1 K.M. Cultivator	40 12 0	....	....
		1 Mysore Plough			
		Total ..	1—40 12 0	6—281 0 0	21—680 0 0
	Bangalore Range.				
1	Singanaikanahalli	Sale of implements	132 8 0	....	....
2	Satyawara	Do	41 8 0	....	....
3	Sulebele	Do	19 12 0	....	....
		Total ..	3—193 12 0	12—563 0 0	10—507 0 0
	Magadi Range.				
1	Arachikanahalli	H. 22 Ragi 300 Srs.	18 0 0	....	....
2	Ijur	„ 87 „	5 3 6	....	....
3	Kudakunte	„ 200 „	12 0 0	....	....
4	Kambal	„ 150 „	9 0 0	....	....
5	Dobspet	„ 275 „	16 8 0	....	....
6	Neralakere	„ 640 „	38 6 5	....	....
7	Adavangi	„ 300 „	18 0 0	....	....
8	Kerekathagnur	„ 425 „	25 8 0	....	....
9	Sondekoppa	„ 320 „	19 4 0	....	....
10	Basavanahalli	„ 80 „	4 13 0	....	....
11	Vobiapur	„ 500 „	30 0 0	....	....
12	Mahadevapur	„ 216¼ „	13 0 0	....	....
13	Biskur	„ 158 „	9 8 0	....	....
14	Arsinakunte	H. 40 Ragi 121 „	7 5 0	....	....
		Total ..	14—226 7 11	44—1167 0 0	31—946 0 0

STATEMENT VII—*concld.*

No.	Name of Village Panchayet	Nature of work done	Value realised 1932-33	1931-32	1930-31
	Channapatna Range.				
1	Maradihalli	240 Srs. Ragi	46 12 0	....	....
		1 Plough			
		1 Cultivator			
2	Chakklur	100 Srs. Ragi	5 0 0	..	....
3	Byrasettihalli	1 K.M. Cultivator	14 14 0	....	....
4	Nagavara	50 Srs. Ragi	51 14 0	....	....
		2 Ploughs			
		1 Cultivator			
5	Thotadahalli	240 Ragi and	....	....	....
		1 Plough			
		1 Cultivator			
6	Yeliyur	400 Srs. Ragi and do ..	53 6 0	....	....
7	Chelur (Kankanhalli) ..	80 Srs. and do	23 12 0	....	....
8	Boredonahalli	600 Srs. Ragi	30 0 0	....	....
9	Murkani	100 do	5 0 0	....	....
		Total ..	9—276 12 0	19—355 0 0	35—830 0 0
	Dodballapur Range.				
1	Chimanchihalli	Implements	14 3 0	....	....
2	Bettadhalsoor	Do	14 3 0	....	....
3	Chikkahejjaji	Do	29 3 0	....	....
4	Dodhejjaji	Seeds	6 0 0	....	....
5	Chikkabelavangala ..	Implements 29-30 seeds 6-0-0	35 3 0	....	....
6	Dodbelavangala	Seeds	6 0 0	....	....
7	Kasaghatta	Seeds	6 0 0	....	....
8	Venkatagirikote	Implements	45 0 0	....	....
9	Doddasagarahalli	Do	29 3 0	....	....
10	Mayasandra	Do	29 3 0	....	....
11	Marulenahalli	Do	4 12 0	....	....
12	Hadonahalli	Do seeds	38 0 0	....	....
13	Hadripur	Implements	226 4 0	....	....
14	Hounadevipura	Do	29 3 0	....	....
15	Madagondahalli	Do seeds	40 8 9	....	....
16	Hassanghatta	Implements	15 0 0	....	....
17	Kodigehalli	Do	24 11 0	....	....
18	Kolur	Do	15 0 0	....	....
19	Madurannahosahalli ..	Do	29 3 0	....	....
20	Veerapura	Seeds and Implements .. 7-8-9 37-10-0	45 2 0	....	....
		Total ..	20—681 15 0	34—702 0 0	28—1092 0 0
	Hunsur Range.				
1	Bannikuppe	2 K.M. Cultivators	56 12 0	....	....
		2 Eureka Ploughs			
2	Hirekyathanahalli ..	Do	56 12 0	....	....
3	Maradur	Do	56 12 0	....	....
4	Ramenahalli	1 K.M. Cultivator	28 6 0	....	....
		1 Eureka Plough			
5	Marsor	Do	28 6 0	....	....
6	Harve	Do	28 6 0	....	....
7	Hullahalli	Do	28 6 0	....	....
8	Gavadagere	Do	28 6 0	....	....
9	Chikkadagenahalli ..	Do	28 6 0	....	....
10	Eohur	Do	28 6 0	....	....
11	Chikkamalahalli	1 K.M. Cultivator	28 6 0	....	....
		1 Eureka Plough			
12	Rajenabilagali	Do	28 6 0	....	....
13	Kalihundi	2 K.M. Cultivators	30 6 0	....	....
14	Manchanahalli	Spara parts	2 0 0	....	
15	Budanur	1 Eureka Plough	43 4 0	....	
		2 K.M. Cultivators			
16	Hosagrahara	Spare parts	2 14 0	....	....
17	Hanasoge	Do	2 14 0	....	....
18	Modur	1 Eureka Plough	28 6 0	....	....
		1 K. M. Cultivator			
		Total ..	18—535 6 0	....	....
		Grand Total ..	80—2585 0 0	136—3946	150—4922

STATEMENT VIII.

Experiments conducted during 1932-33.

Ranges	Paddy	Sugarcane	Potatoes	Total
Mysore	5	..	..	5
T.-Narsipur	..	1	..	1
Chamarajanagar	1	1	..	2
Yedatore	10	..	..	10
Bangalore	2	1	2	5
Channapatna	1	..	..	1
Magadi	1	4	..	1
Total ..	20	3	2	25

STATEMENT IX.

Experiments conducted during the year 1932-33 (Varietal).

Ranges	Ragi	Paddy	Sugarcane	Groundnut	Cotton	Total
Mysore	1	..	2	..	..	3
Chamarajanagar	..	1	2	..	..	3
T.-Narsipur	..	4	2	1	2	9
Hunsur	2	..	..	..	..	2
Bangalore	1	..	..	1	..	2
Channapatna	..	2	..	..	..	2
Dodballapur	..	2	..	..	..	2
Magadi	2	..	1	1	..	4
Total ..	6	9	7	3	2	27

STATEMENT X.

Statement showing the pumping outfits in usage for irrigation during 1932-33 in the Mysore Circle.

Ranges	District	Taluk	Locality	Name of the owner	Discription of the outfit
Chamarajanagar	Mysore ..	Chamarajanagar	Chamarajanagar	Mr. Venkatasubbiah ..	5 B.H.P. Peter Oil Engine.
Do ..	Do ..	Do ..	Do ..	,, Siddasetty ..	Do
Do ..	Do ..	Do ..	Ramasandra ..	,, C. D. Narayana Rao	Do
Do ..	Do ..	Do ..	Dollipura ..	,, Rachasetty ..	8 B.H.P. Do
Do ..	Do ..	Gundlupet ..	Gundlupet ..	,, Chunchegowda ..	6 Do Crossby
Do ..	Do ..	Do ..	Do ..	,, Neelakantiah ..	5 Do Peter.
Do ..	Do ..	Do ..	Do ..	,, Honnappa ..	Do
Do ..	Do ..	Do ..	Chikkahalli ..	,, Nanjappa ..	Do
Do ..	Do ..	Yelandur ..	Yelandur ..	,, B. K. Narasinga Rao	5 do
Do ..	Do ..	Do ..	Malalhalli ..	Do ..	3 do
Do ..	Do ..	Do ..	Komarapura ..	,, S. Rangachar ..	5-6 do Safie.
Do ..	Do ..	Do ..	Yelandur ..	,, Biligiri Ranga Reddi.	5 B.H.P. Peter.
Do ..	Do ..	Do ..	Do ..	Do ..	6 B.H.P. Power.
Do ..	Do ..	Do ..	Do ..	,, Narasinga Rao ..	One Cotangapower cane crusher.
Channapatna ..	Bangalore ..	Kankanhalli ..	....	,, Thimmappa, son of Sampangiappa.	
Do ..	Do ..	Do ..	....	,, Gurunanjappa ..	
Do ..	Do ..	Do ..	....	,, Kondiah ..	
Do ..	Do ..	Do ..	....	,, Venkatappa ..	
Do ..	Do ..	Do ..	Kabbal ..	,, Venkatakrishnappa, son of Krishnappa.	
Do ..	Do ..	Do ..	....	,, Appajappa ..	
Do ..	Do ..	Do ..	....	,, Ramiah, son of Thimmasetty.	
Do ..	Do ..	Do ..	....	,, Mugiah ..	
Do ..	Do ..	Do ..	....	,, Narayanasetty ..	
Do ..	Do ..	Do ..	Venkatarayan doddi.	,, Chamegowda ..	
Do ..	Do ..	Do ..	Do ..	,, Lakshmanagowda ..	
Do ..	Do ..	Do ..	Do ..	,, Javaregowda ..	
Do ..	Do ..	Channapatna ..	Channapatna ..	,, R. T. Narasimhiah	
Do ..	Do ..	Do ..	Mangapatna doddi.	,, Venkategowda ..	

Bangalore.—Many of the land owners are making use of both Electirc and Oil Engine and power for pumping water and also for milling of sugar-cane. About 20 Electric pumps are installed in addition to the 60 already in existance and about 5 sugar cane crushers with power attachment.

T.-Narsipur ..	Mysore ..	Nanjangud ..	Kalale ..	,, Venkata Rao ..	3 H.P.
Do ..	Do ..	Do ..	Harohalli ..	Do ..	4 H.P.
Do ..	Do ..	Do ..	Nanjangud ..	,, Gururaja Rao ..	1.6 H.P.
Do ..	Do ..	Do ..	Hosahalli ..	,, Shankararaya ..	3 H.P.
Do ..	Do ..	Do ..	Upparahalli ..	Devanaika ..	3 H.P.
Do ..	Do ..	Do ..	Kalale ..	Ranga Rao ..	3 H.P.
Do ..	Do ..	Do ..	Nanjangud ..	Seetharamiah ..	3 H.P.

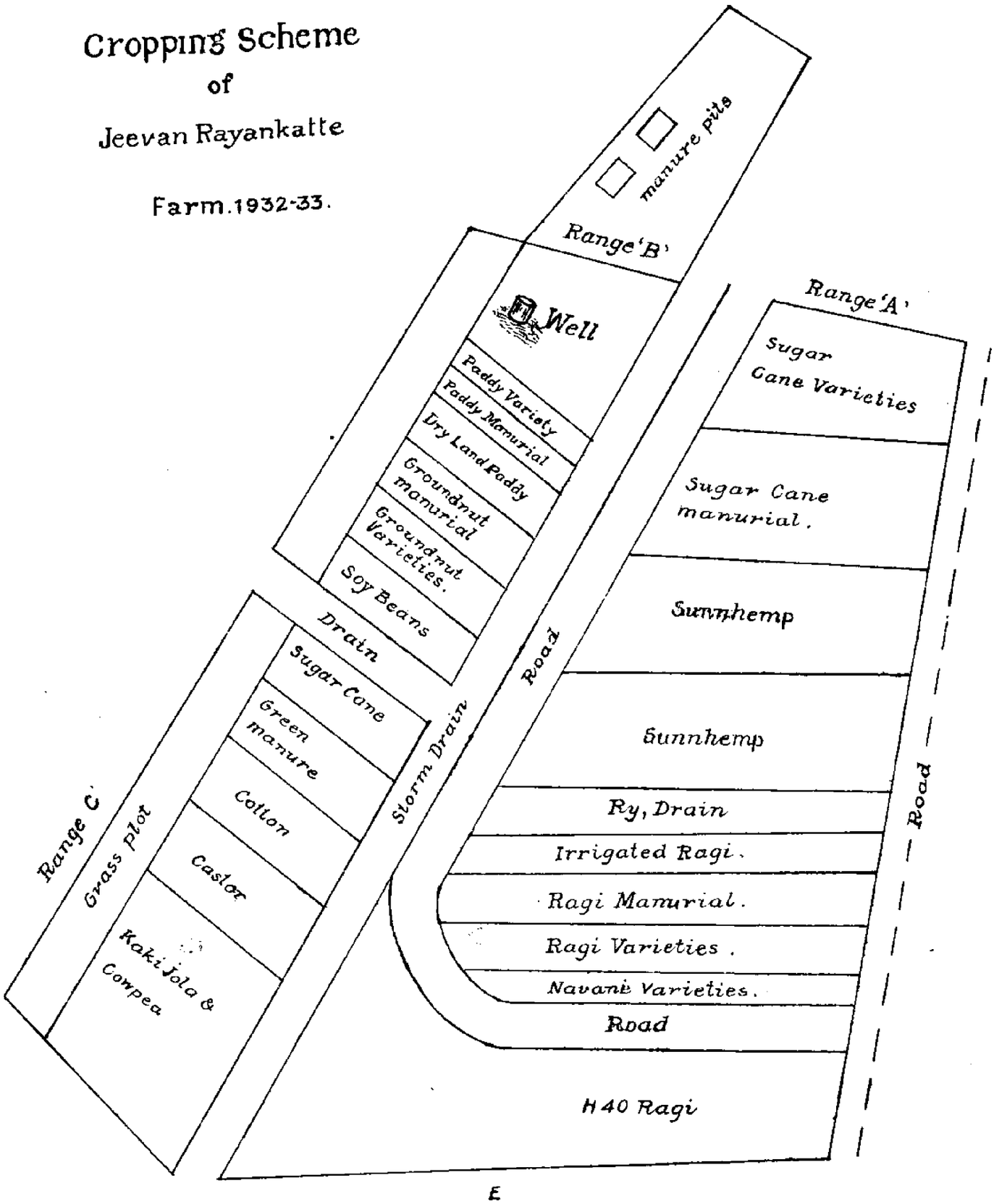
Besides the above, Messrs. C. Venkata Rao, Nanjangud, A. Rama Rau, Hosalvadi, Siddappa, Nagara, and Subbaraya of Hoskote of Nanjangud Taluk own Oil Engines of 3 to 6 H.P. for irrigation purposes.

Statement showing the paddy yield, manured with artificial fertilisers, issued under the New Takavi Loan scheme during 1932-33. sanctioned in G. O. No. 5416-26--A. & E. 31-32, dated 29th April 1932.

Sl. No.	Name and address of the Party	Treatment				Yield per acre				Check Plot		Extra yield due to the application of manure		Money value	Net profit per acre	Remarks
		No. of acres	Kind of Paddy	Organic manure	Artificial manure	1931-32		1932-33		1932-33						
						Grains	Straw	Grains	Straw	Grains	Straw	Grains	Straw			
	I. Mysore Range.	A. G.			per acre									Rs. a. p.	Rs. a. p.	
1	Mr. Sivananje Gowda, .. Nagenahalli.	1 10	S. 236	..	80 lbs. of Am_2SO_4 & 112 lbs. of Supers	..	..	1,550	4,000	1,530	..	..	..	....	....	The opinion of the raiyat in general is that by the Application of artificial manures the yield through greater cannot get good price owing to trade slump. They desire the scheme to be given effect to for 3 successive years to form a definite opinion.
2	,, Dodhutche Gowda, Nagenahalli.	2 0	G.E.B. 24	..	do	..	..	1,300	2,500	900	..	400	2,425	25 0 0	7 8 0	
3	Kulle Gowda, Nagenahalli..	1 10	Kaddi	..	do	..	..	1,000	4,000	1,000	..	..	..	..	..	
4	Nanji Gowda, Kalaswadi ..	1 0	G.E.B. 24	..	do	..	..	1,280	600	1,120	..	160	..	10 0 0	1 8 0	
5	Ramalinga Naika do ..	5 0	do	..	do	..	..	1,481	2,240	1,250	..	231	21,00	14 0 0	5 8 0	
	II. T.-Narsipur.															
6	Mr. Subba Rao, Molehundi	3 32	do	25 cart-loads green manure crop.	500 lbs. Niciphes 18—22 grade.	..	..	1,750	3,500	1,450	2,200	300	..	18 12 0	10 4 0	
7	Siddiah Jeevanahalli, Nanjangud Taluk.	1 0	do	Local manure was not used; Green manure was not enough.	100 lbs. Niciphos.	..	..	1,500	..	1,200	..	300	..	18 12 0	10 4 0	Do
	III. Yedatore Range.															
8	Ramalinge Gowda, Tippur	5 0	do	50 cart-loads.	500lbs do	1,460	..	1,700	11carts	..	..	..	..	..	..	In the absence of the yields from Check plots which is reported to have been not clearly laid by Mr. B. R. Gururaja Rao, Ex. Agricultural Inspector the comparative study could not be made any way last year's and this year's yields are justified. It is reported by the A. I. that the raiyats are convinced without doubt that it is possible to use fertilizers to paddy and the scheme should be continued.
	Do ..	4 0	Kembuthi	..	400 ,,	1,440	..	1,620	10 ,,	..	..	..	..	..	..	
9	Gollanaika do ..	6 0	G.E.B. 24	..	700 ,,	1,200	..	1,440	12 ,,	..	..	..	..	..	..	
10	Manchnaika do ..	6 0	do	..	600 ,,	1,440	..	1,560	14 ,,	..	..	..	..	..	..	
11	Nanje Gowda	7 0	do	..	900 ,,	1,671	..	1,851	20 ,,	..	..	..	..	..	..	
12	Javariaya Setty ..	2 20	do	..	300 ,,	1,296	..	1,440	5 ,,	..	..	..	..	..	..	
13	Veeranna, Guligakere ..	7 0	do	..	700 ,,	1,620	..	1,800	..	..	..	..	..	..	..	
14	Venkata Rao	7 0	do	..	700 ,,	1,543	..	1,620	..	..	..	..	..	..	..	
15	Kunegowda, Dodkoppal ..	2 20	do	..	300 ,,	1,800	..	1,800	..	..	..	..	..	..	..	
16	Chikke Gowda, do ..	6 0	do	600 ,,	..	..	..	1,530	..	..	..	..	..	..	..	

Cropping Scheme
of
Jeevan Rayankatte

Farm. 1932-33.



Assistant Director Of Agriculture,
Mysore Circle.

M.R.N.

10-5-34. Litho, Govt. Press Bangalore.

ANNUAL REPORT OF JEEVANARAYANAKATTE AGRICULTURAL DEMONSTRATION PLOT FOR THE YEAR 1932-33.

Seasonal Conditions.—The Mungar Rains were moderate during the year; but there were heavy showers of Hingar Rains.

Crops.—Herewith appended the cropping plan. Except paddy varieties, all the crops of the previous year were repeated during this year.

Sugar-cane.—All the canes were excellent in growth but they were heavily lodged. Major portion of these was supplied for seed purposes in the Mandya area. The results are embodied in the statement.

Paddy.—The growth was good and the lodging was propped up. The results are incorporated in the statement appended.

Ragi.—Both manurial and varietal crops were splendid in growth; and presented a good appearance at the time of Dasara. (*Vide* statement.)

Ground nut.—The ground-nut varieties were all in their top growth; and the yield of the some of them was good. (*Vide* statement enclosed.)

Jola.—This crop was affected by Aphis at the beginning which after spraying with fish oil Soap, recovered a little. The crop came up afterwards but was not very good.

Sunn hemp, Caster, Cotton and several varieties of grass—were also grown on the Farm which all presented an excellent growth.

Conclusion.—At the time of Dasara, thousands of people visited the Farm and were impressed with the growth of all the standing crops. As usual, Jaggory boiling on improved furnace, and sugar-cane milling with a power driven mill were demonstrated at the time of exhibition.

S. H. BENNUR,
Assistant Director.

Paddy Varieties.

No.	Varieties	Yield per acre in seers	Yield per acre Straw in Pounds	Remarks
1	G. E. B. 24	3,000	10,000	
2	S.12. Nagpuri	4,000	18,000	
3	S.236. „	5,500	14,000	
4	S.246. „	4,375	12,000	
5	Pichodi	2,875	7,000	
6	P. S. 49	3,750	8,000	
7	P. S. 50	4,250	8,000	
8	Colamba. 42	4,250	9,000	
9	Banku	3,635	12,000	
10	Black, scented	3,500	8,000	
11	Kembuthi	3,750	8,000	
12	Basamathi	2,435	5,000	
13	Alur Sanna	3,750	9,000	
14	S. 138, Kaddi	3,550	12,000	
15	S. 139 „	3,750	12,000	
16	S. 149 „	3,500	13,000	
17	Aduthori	2,500	4,000	

Paddy Manurial. S.12.

No.	Manure	Yield per acre Grains in Seers	Yield per acre Straw in Pounds	Remarks
1	Check cattle manure 4 carts per acre ..	3,500	12,000	
2	Ground-nut cake 200 Lbs. do ..	3,500	14,000	
3	Ground-nut cake 200 „	3,500	14,000	
	Supers 168 „ do ..			
4	Caster cake 400 „ do ..	4,200	16,000	
5	Caster cake 400 „	4,000	14,000	
	Supers 168 „ do ..			
6	Ground-nut cake 100 „	4,000	16,000	
	Caster cake .. 200 „ do ..			
7	Ground-nut cake 100 „	4,500	16,000	
	Caster cake 200 „			
	Supers 168 „ do ..			
8	Ground-nutcake 100 „	4,750	15,000	
	Niciphos .. 67 „ do ..			
9	Ammonium Sulphate 80 „	4,250	15,000	
	Supers 168 „ do ..			
10	Check .. „ do ..	4,750	14,000	
11	Ammophos 20–20 100 „	4,500	13,000	
	Supers 55 „ do ..			
12	Soda Nitrate 100 „	4,000	13,000	
	Supers 168 „ do ..			
13	Honge leaves 10,000 „	3,500	15,000	
14	Honge leaves 10,000 „	3,750	18,000	
	Ammophos 13–48. 100 „			
15	Honge leaves 10,000 „	3,750	20,000	
	Supers 168 „			
16	Honge leaves 10,000 „	3,750	15,000	
	Niciphos 100 „			
17	Check	4,500	13,000	

Sugar-cane Varieties.

No.	Varieties	Yield per acre in Tons	Remarks
1	Babbur striped	61–72	All the varieties lodged badly.
2	H. M. 553	62–36	
3	Pattapathi	32–29	
4	J. 33.-A.	78–96	
5	H. M. 544	58–29	
6	H. M. 320	69–47	
7	H. M. 500	40–94	
8	H. M. 600	46–83	
9	H. M. 003-8	89–83	

Sugar-cane Manurial. Pattapathi and H. M. 320.

No.	Manures	Pattapathi	H. M. 320	Remarks
		Yield per acres in Tons	Yield per acre in Tons	
1	No manure	31–75	38–82	Whole plots lodged very badly.
2	Cattle manure	20–19	33–13	
3	Ammonium Sulphate 240 Lbs. ..			
	Super phosphate 336 ,, ...	30–06	66–04	
	Groundnut oil cake 1 Ton ..			
	Cattle manure 10 carts per acre			
4	Ammophos 13–48 100 Lbs. ..			
	Supers 80 ,, ..	37–61	63–69	
	Ammonium Sulphate 187 ,, do ..			
5	Soda Nitrate 200 ,, ..			
	Supers 336 ,, ..	35–47	53–08	
	Ammonium Sulphate 80 ,, do			
6	Lunaphos 80 ,, ..			
	Supers 248 ,, ..	41–68	65–77	
	Ammonium Sulphate 160 ,, do ..			
7	Niciphos 100 ,, ..			
	Supers 86 ,, ..	35–73	51–27	
	Ammonium Sulphate 180 ,, do ..			

Ragi Varieties.

No.	Varieties	Grains per acre in Seers	Straw per acre in Pounds	Remarks
1	Hullubele	1,280	10,560	
2	H.22	1.680	12,480	
3	H.19	1,120	9,280	
4	H.70	1,680	9,920	
5	H.2	1,200	10,240	
6	H.40	1,280	9,600	

Ragi Manurial. H. 22.

No.	Manures	Grains per acre in Seers	Straw per acre in Pounds	Remarks
1	Check cattle manure 4 carts	1,760	....	
2	Ground-nut cake 125 Lbs. ..	1,840	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			
3	Ammonium Sulphate 25 „ ..	1,760	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			
4	Ground-nut cake 62½ „ ..	1,760	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			
5	Ammonium Sulphate 25 „ ..	1,680	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			
6	Caste cake 250 „ ..	1,680	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			
7	Caster cake 125 „ ..	1,760	....	
	Supers 75 „ ..			
	Pot. Chloride 20 „ ..			

Ground-nut Varieties.

No.	Variety	Yiled per acre in Seers	Remarks
1	Velencia	1,440	
2	H. G. 1	1,760	
3	Sugatur	1,000	
4	Mauritius	1,200	
5	Verginia	1,200	
6	Big Japan	1,120	
7	Small Japan	1,600	

Ground-nut Manurial. H. G. 1.

No.	Manures	Yield per acre in Seers	Remarks
1	Check cattle manure 4 cart-loads	2,400	
2	Ammonium Sulphate do 40 Lbs.	2,640	
	Supers do 168 „		
	Sulphate of potash do 40 „		
3	Ammophos 13–48 do 80 „	2,640	
	Sulphate of potash 40 „		
4	Niciphos 17–45 57 „	3,040	
	Supers do 28 „		
	Sulphate of potash 40 „		
5	Diamophos 40 „	2,800	
	Supers do 50 „		
	Sulphate of potash 40 „		
6	Soda Nitrate 50 „	2,600	
	Supers do 168 „		
	Sulphate of potash 40 „		

ADMINISTRATION REPORT OF THE ASSISTANT DIRECTOR OF AGRICULTURE, TUMKUR CIRCLE, TUMKUR, FOR THE YEAR 1932-33.

1. I continued to be in charge of the Circle throughout the year in addition to the charge of the Sri Krishnarajendra Vyavasaya Dharma Pathasala, as usual, and was on privilege leave for 15 days from 1st to 15th August 1932 both days inclusive.

2. *Tours.*—I was on tour for 158 days during the year of report and the Agricultural Inspectors under me toured in their respective ranges for periods noted hereunder:—

Name of Range.	1931-32	1932-33
Tumkur Range	200 days	164 days.
Tiptur Range	138 „	150 „
Madhugiri Range	157 „	158 „
Kunigal Range	190 „	218 „
Kolar Range	198 „	180 „
Chikballapur Range ..	207 „	196 „
Chintamani Range	184 „	217 „
Goribidnur Range	168 „	141 „

More touring could not be done due to very limited allotment under Travelling Allowance on account of financial depression which continued.

3. *Library.*—As observed last year there were no fresh additions this year also which require due consideration.

Correspondence.—Seven thousand three hundred and fifteen letters were received during the year and 7,097 letters were sent out against 7,311 and 5,980 respectively of the past year.

5. *Offices and Depot Inspections.*—Except the Kolar and Chintamani Range offices and depots, all the rest were duly inspected and reports submitted to the Director of Agriculture including those left out during the previous year.

6. *Seasonal conditions.*—The seasonal conditions during the year were far better when compared to those of the year previous and there was copious and timely rainfall all over which greatly helped all agricultural operations in general. The scarcity for fodder reported last year had completely disappeared.

7. *Demonstration of Implements.*—The demonstration of improved implements with a view to popularise their use and sale continued and 233 of such demonstrations were held during the year as against 251 reported last year. The District Board of Tumkur were kind enough to continue their subvention which greatly helped the work in this direction. The District Board of Kolar also came forward with their usual quota and the sum sanctioned could not be made use of as it was not placed at my disposal till almost the tail end of the year. A reference has since been submitted to the Director of Agriculture to obtain Government sanction for the utilisation of this grant during the year 1933-34. To avoid such deviations, it is very necessary that the District Board should place the amount early in the beginning of the year to enable its proper and timely use. Statement I gives the various kinds of demonstrations held during the year with comparative figures for the past two preceding years.

8. *Sale of improved implements.*—The economic depression reported last year continued and there was therefore no appreciable increase in the sale of these implements. Statement II gives the number of implements sold during the year as also those sold in the past two years. The small Mysore model ploughs newly introduced are gaining popularity.

9. *Sugarcane mills.*—The Sugarcane Mills of Messrs. Madhurai Mudaliar & Sons, Bangalore, continued to be popular and 29 mills were sold during the year as against 30 in the preceding year. Apart from the supply through the Department, there have also been direct purchases from the Firm which go to show the efficacy and popularity of these mills.

The following is the distribution of mills and pans, Rangewar for three years from 1930-31 :—

Name of Range	Sugarcane mills			Pans		
	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33
1. Tumkur	1	1	..	..	1	..
2. Tiptur	..	..	..	..	..	..
3. Madhugiri	1	1	..	3	1	..
4. Kunigal	3	2	..	4	1	..
5. Kolar	3	3	1	4	..	2
6. Chikaballapur	7	13	22	14	26	49
7. Chintamani	..	2	..	..	..	..
8. Goribidnur	7	8	6	14	16	14
Total ..	22	30	29	39	45	65

10. *Mhote Wheels.*—Though the advantages of these are greatly appreciated by the raiyats their cost which is rather prohibitive came in the way of their expansion and popularity.

11. *Pumping Plants.*—The availability of Electric power in certain ranges of the Circle has facilitated the introduction of pumping plants for lift irrigation as reported last year and the raiyats are gradually coming forward to take advantage of the same, and it is likely to extend in places wherever electric power is being introduced.

12. *Cultivation methods.*- Eighty-five demonstrations as against 36 in the previous year were held during the year in improved method of cultivation such as single seedling transplanting earhead selection and wider planting of sugarcane with very satisfactory results and the raiyats have been quite convinced of the advantages of these improved methods which are gaining popularity.

13. *Jaggory boiling on improved lines.*—At the request of some of the clients of the Department, improved furnaces were built in six places and successfully worked with quite satisfactory results. Four Fieldmen of this Circle were specially deputed to Hebbal during the year for training in this connection and their services have been very useful in this line. This procedure saved a lot of money and trouble from getting trained men from Hebbal who would not be available whenever wanted. The remaining Fieldmen of the Circle will be arranged to be deputed to Hebbal for training by turns, so that more furnaces could be got erected during the milling season. The demonstrations conducted under this head amounted to 40 during the year of report.

14. *Ensilage.*—The raiyats are gradually taking to this kind of fodder preservation and as a result, three silo pits were opened during the year, one in Tumkur Range one in Kunigal Range, and one in Goribidnur Range under Departmental advice. Fodder jola and green grass are largely used for ensilaging.

15. *Manures.*—The preservation of cattle manure in consolidated pits having roofing, is getting popular as being decidedly superior to heaped manure and model manure pits are being opened in large numbers by the raiyats as advised by the Department.

Sannhemp for green manure is being recommended for cocoanut gardens and the demand for the same is increasing.

Honge plantations are a feature of the Kolar District for green manure, and are reported to be progressing well.

As in the past few years, the use of artificial manures has been on the increase and Manure Companies are opening their own depots to meet the demand. No correct figure can be given as regards the sales, as only three depots, *viz.*, Tumkur, Tiptur and Madhugiri are at present dealing with these manures on consignment account, the sales in other ranges being conducted by the agencies of the Manure Companies, and the approximate quantity of all kinds of artificial manures sold during the year in this Circle, including the agencies is 133 tons 1,786½ lbs. as against 74 tons 1,851 lbs. of the previous year.

16. *Crops.*—The supervision and expansion of 'A' and 'B' Farms continued for the multiplication of the improved variety of H22 ragi which, however, suffered heavily due to abnormal rains at the time of harvest. H22 ragi has favourably impressed the raiyats as being draught resistent. K. 1. ragi tried with the local Konanakombu at Tiptur has given good results in that the former gave six pallas per acre as against two pallas of the latter which took a month and 20 days more to mature. Six varieties of Kar Ragi got from the Ragi Breeding Station were tried in five places in Madhugiri Range. The germination in three places did not take place due to failure of rains and in the other two the crops were poorer than the local ones. H45 variety tried with local gidda ragi at Kallodi, Goribidnur Taluk had a better yield than the local both in grains, as well as in the yield of straw The quantity of ragi distributed of all kinds during the year was 28,353½ Srs.

Groundnut.—Besides the Hg. 1 groundnut already introduced and is expanding in cultivation, Valencia variety of groundnuts were introduced during the year and the demand for this variety is increasing. This is faring very well side by side with Hg. 1.

Paddy.—Since there was good and sufficient rainfall during the year, all the tanks were full and the demand for seed paddy increased by leaps and bounds and could not be met in full. The varieties of seed paddy distributed were Kapile sanna, Halubhalu and Chintamani sanna. The total quantity of all kinds of paddy distributed was 19,662¼ Srs. as shown in Statement No. III.

Sugarcane.—Improved varieties of cane such as H. M. 320 and Babbur striped are rapidly increasing, but the demand for setts during the year of report was practically nil due to stoppage of the system of free distribution of setts from the Depatmental Farms, consequent on the starting of sugarcane Farms by Government in the Irwin Canal area and their sales for cash only. The distribution of setts during the year was therefore mainly by private negotiation from range to range in the Circle, in some cases setts were got supplied for cost from the Hebbal Farm.

Miscellaneous crops.—Commercial crops such as Potatoes Onions and Chillies, Selection 69 cotton and Ginger are being raised and different kinds of vegetable seeds and fruit plants were supplied on indents received from time to time. Manurial trials in the cocoanut gardens of Mr. K. B. Chendrasekharaiya of Tiptur started three years ago continued to show good progress. In two places (the number of trees in each being 20) the manured trees yielded 243 and 255 nuts more than the check plots and in the third place the check has given 105 nuts more than the *manured* plot. Pepper vine cuttings, Ginger and pine suckers supplied to Goribidnur and Kolar Ranges respectively from the Marthur farm are progressing well. Ginger is rotated with potato in the Chikaballapur Range mostly in the garden areas. The Overseas Potash Syndicate are conducting manurial experiments on potatoes in Chikaballapur in co-operation with the Department and the results are being keenly watched.

Mention may be made here that 200 seed cocoanuts were supplied to the Madras Agricultural Department the selection of seeds being made from Tiptur Cocoanut gardens.

In places where Avare pod borer demonstrations were carried out, the results were good.

Fodder Crops.—Regarding growing of fodder in gomal lands of villages selected for the purpose no progress could be reported for want of early co-operation from the Revenue Department to start the scheme as an experiment, and from the reference very recently received from the Deputy Commissioner Tumkur, it is seen that definite orders are sought for from the Revenue Commissioner in the matter.

With a view to improve the Date groves of Sonnavadi and Dodderi villages in the Madhugiri Range, fodder jola was grown on about eight acres in Sannavadi and three acres in Dodderi out of the land ploughed under Departmental supervision at the request of the Sub-Division Officer Madhugiri, and a sum of Rs. 85 was realised from the crop against an expenditure of Rs. 31 as under:—

		Rs.	a.	p.
1.	Cost of ploughing	18	8	0
2.	Seeds supplied	12	8	0
	Total ..	31	0	0

But for the fact that the crop at Sonnavadi began to wither for want of rains after germination and the crop on about one acre in Dodderi having been eaten away by stray cattle due to lack of proper fencing the realisation from the crop would have been still higher.

Statement III gives the details of distribution of important seeds such as ragi, paddy, groundnut and sugarcane.

17. *Insect Pests and Fungus diseases.*—Kerosine oil treatment on rice case worm and trash heap method against sugarcane borer are largely advised, and the raiyats are readily adopting the remedial measures.

Spraying with Bordeaux mixture on potato crops against Alternaria were taken up in several places with very satisfactory results.

18. *Village Panchayets and Co-operative Societies.* These organisations have, as usual, continued to take interest to push on the activities of the Department by way of purchasing improved implements, seeds and manures for distribution to the raiyats and in the year of report 150 village Panchayets and 21 Co-operative Societies in all have co-operated with the Department. The Goribidnur Co-operative Society still maintains the high record of progress in this direction. It is hoped that a larger number of these bodies will come forward to take up and carry on the improvements suggested by the Department in the developments of improved Agriculture.

Statement IV gives the comparative work done by these bodies, for the three years ending 1932-33.

19. *District Boards.*—As already stated the District Boards of Tumkur and Kolar were good enough to grant a subvention of Rs. 300 and Rs. 200 respectively for development work of the Department and a higher quota of contribution is very necessary for furthering the progress of improved methods of Agriculture.

20. *Depots.*—The realisations from the transactions of each range are as detailed below :—

No.	Name of Range	1930-31	1931-32	1932-33
		Rs. a. .	Rs. a. .	Rs. a. p.
1	Tumkur	3,127 8 9	2,876 0 5	907 2 1
2	Tiptur	1,867 1 0	1,405 5 7	1,402 10 6
3	Madhugiri	2,078 15 4	1,097 10 1	397 10 3
4	Kunigal	693 4 6	815 4 6	1,407 12 11
5	Kolar	1,543 11 2	2,720 5 10	1,586 11 4
6	Chikaballapur	3,391 15 3	4,352 4 5	6,630 2 10
7	Chintamani	496 4 5	939 13 11	934 2 4
8	Goribidnur (including Goribidnur Society).	3,215 1 6	4,694 10 2	2,064 10 4
	Total ..	16,413 13 11	18,801 6 11	15,380 14 7

21. *Conclusion.*—The thanks of the Department are due to the District Boards of Tumkur and Kolar for their financial help and to the several non-official gentlemen and officers of the other Departments for their kind co-operation and valuable assistance.

S. DANIELL,
Assistant Director of Agriculture.

STATEMENT No. I.

Statement showing the demonstrations of Tillage Implements Jaggory Boiling etc. conducted in Tumkur Circle for the three years ending 30th June 1933.

Serial No.	Name of Range	No. of ploughing			No. of cultivating			Jaggory Boiling			Seed Selebtion			Miscellaneous		
		1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33
1	Tumkur	12	35	19	6	2	4	1	8	8	..	3	4	..	..	6
2	Tiptur	27	25	4	20	4	2	2	1	..	..	11	..	..	..	3
3	Madhugiri	69	58	34	48	30	27	3	20	..	20	..	46	..	..	..
4	Kunigal	4	3	10	..	..	3	5	8	5	2	7	9	..	..	11
5	Kolar	31	34	28	15	12	18	1	1	7	..	..	5	..	..	..
6	Chikballapur	21	15	28	3	..	2	5	7	13	6	..	..	..	..	2
7	Chintamani	20	16	8	7	5	2	1	..	2	4	..	..	..	..	..
8	Goribidnur	12	12	23	2	..	21	..	8	5	..	9	..	..	..	..
	Total ..	196	198	154	101	53	79	18	53	40	32	30	63	..	..	22

STATEMENT No. II.

Comparative statement showing the sale of Implements in the Tumkur Circle for the last three years commencing from the year 1930-31.

Serial No.	Name of Range	K. M. Ploughs			Eureka Ploughs			Mysore Ploughs			Mysore Type Ploughs			K. M. Type Ploughs			Meston Ploughs			Kirloskar Ploughs			Cultivators			Spare Parts		
		30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33	30-31	31-32	32-33
1	Tumkur	32	5	1	12	5	4	15	2	1	..	..	..	..	..	2	2	8	4	2	..	..	46	15	3	46	90	5
2	Tiptur	12	11	14	39	16	6	..	..	..	..	..	..	..	4	4	..	..	..	..	1	..	20	15	7	97	125	12
3	Madhugiri	20	4	2	8	6	3	3	..	3	..	..	..	..	..	3	..	..	..	5	..	..	26	10	6	15	35	18
4	Kunigal	2	1	2	12	1	1	1	..	..	..	..	21	..	1	4	..	..	..	..	..	..	13	9	15	11	16	12
5	Kolar	102	172	6	40	49	8	22	23	..	..	..	4	..	14	20	3	3	..	..	..	..	23	27	3	52	135	65
6	Chikaballapur	10	4	4	6	10	2	4	1	..	..	..	3	..	4	13	..	20	1	..	..	..	8	2	6	43	62	83
7	Chintamani	1	1	1	8	1	14	3	4	..	..	..	6	..	5	16	..	1	4	..	..	..	4	5	8	17	30	26
8	Goribidnur	8	5	..	..	..	..	1	1	..	..	..	..	..	24	4	..	..	..	2	..	..	8	3	2	26	28	23
	Total ..	187	203	30	125	88	38	49	31	4	..	..	34	..	52	66	5	32	9	9	1	..	148	86	50	307	521	406

STATEMENT No. III.

Comparative statement showing the distribution of new varieties of seeds in Tumkur Circle for the three years ending 30th June 1933.
(Commencing from the year 1930-31.)

Serial No.	Name of Range	Paddy			Ragi			Groundnuts			Sugarcane Setts			Remarks
		1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	1930-31	1931-32	1932-33	
		Srs.	Srs.	Srs.	Srs.	Srs.	Srs.	Srs.	Srs.	Srs.	Setts	Setts	Setts	
1	Tumkur	868	2,587	3,568	5 776½	11,717½	3,053	231½	400	160	7,8750	23,500	30,000	The distribution of cane setts during 1932-33 was mostly through private negotiation.
2	Tiptur	597	772	1,975½	8,208	607	3,788	124	..	195	90,700	44,000	4,000	
3	Madhugiri	1,600	986	6,419½	1,070	1,158	281½	230	..	207	34,000	68,000	80,500	
4	Kunigal	373	500	1,200	3,998½	7,984½	5,194½	221	..	41½	26,000	7,000	13,516	do
5	Kolar	1,412	1,360	664	25,220	3,128	5,705	392	..	..	49,000	30,000	28,000	do
6	Chikballapur	263	458	1,875	9,427	5,916½	2,391½	22	..	400	12,000	15,000	15,000	do
7	Chintamani	86	192	1,860½	5,166	3,936	4,968	171	170	100	15,950	14,000	7,500	do
8	Goribidnur	808	180	2,100	9,187	4,475	2,707	400	460	750	12,360	18,000	..	do
	Total ..	6,007	7,035	19,662½	68,050	38,922½	28,353½	1,791½	1,030	1,853½	3,18,760	2,19,500	1,78,516	

STATEMENT No. IV.

Comparative statement showing the work done in connection with the Village Panchayet and Co-operative Societies in Tumkur Circle, for the three years commencing from 1930-31

Serial No.	Name of Range	Village Panchayets						Co-operative Societies						Remarks
		1930-31		1931-32		1932-33		1930-31		1931-32		1932-33		
		No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
			Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.	
1	Tumkur	54	1,937 5 5	36	1,128 1 5	16	334 11 8	3	56 5 9	4	258 3 3		....	
2	Tiptur	43	1,178 5 7	24	601 14 3	4	108 9 0	6	355 6 2	4	125 12 8	7	209 7 3	
3	Madhugiri	39	1,262 1 11	14	271 6 4	9	345 2 0	3	328 14 0	4	330 8 10		....	
4	Kunigal	33	337 6 5	18	299 4 4	31	742 12 7	7	372 6 9	8	312 3 7	1	17 4 6	
5	Kolar	68	3,859 6 0	23	551 6 3	13	353 11 4	6	132 6 0	..	....	3	270 9 9	
6	Chikballapur	21	2,105 7 9	27	3,129 12 6	42	5,307 8 9	1	231 0 0	5	290 12 0	4	508 10 0	
7	Chintamani	9	240 2 6	15	476 5 0	23	812 1 3	7	101 6 0	6	229 8 0	5	75 1 5	
8	Goribidnur	16	1,496 12 0	14	2,132 2 5	12	189 15 5	6	2,936 2 9	3	3,131 1 9	1	1,357 0 3	
	Total ..	283	12,416 15 7	137	8,590 4 6	150	8,188 8 0	39	4,503 15 11	34	4,678 1 10	21	2,438 1 2	

ANNUAL ADMINISTRATION REPORT OF MANDYA CIRCLE FOR THE YEAR ENDING 30TH JUNE 1933.

ADMINISTRATION.

1. *Jurisdiction.*—This new Circle at Mandya was started on 5th January 1933 as per Government Order No. D. 3205-8 A. & E. 95-32-7 dated 5th January 1933. Before the formation of this Circle, the three institutions then existing, namely, Mandya Depot, Maddur Depot and Kodihalli Farm were under the control of the Mysore Circle.

The Jurisdiction of the Mandya Circle extends over the taluks of Mandya, Maddur, Malavalli and a part of Seringapatam. The work of the Circle consists in the main of:

1. The propaganda work of the four taluks mentioned above.
2. The propaganda in relation to profitable crop rotation to suit the Block System of Irrigation under the Irwin Canal.
3. The encouragement of Sugarcane Cultivation as a commercial crop by the ryots of the area, (through the scheme of advances for Factory supply) and
4. The direction and control of Sugarcane Cultivation on Government Land for supply to the Sugar Factory.

The major work of the Circle can be divided into two broad groups.

(*a*) The grant of advances on credit basis to raiyats for Sugarcane Cultivation for Implements, such as ploughs cultivators etc.

Sugarcane Setts.
Artificial fertilisers.
Cash.
(Bullocks in a few cases.)

(*b*) Sugarcane Cultivation on the following Farms through departmental Agency

Kodihalli Farm.
Malligere Farm.
Satnur Farm.

An extract from Government Order No. D. 3205-8 A. & E. 95-32-7, dated 5th January 1933 containing the Budget of the Circle is furnished in Statement No. V.

2. *Charge.*—I was in charge of the Circle throughout the period and also during the earlier half of the year when the Development work of the Irwin Canal Area was under the control of the Mysore Circle.

Depots.—There were already depots at Maddur and Mandya. A new Depot at French Rocks was opened from 1st May 1933 in place of the depot at Nagamangala as per Government Order No. D. 5729-30—A. & E. 227-32-2, dated 12th May 1933.

Mr. C. V. Ramiah was in charge of Mandya Depot till 22nd November 1932 when he was succeeded by Mr. T. Rangaswami who continued throughout the remaining period of the year.

Mr. K. Basavaraj Urs was in charge of Maddur Depot during the year.

Mr. H. M. Subbiah was appointed for French-Rocks Range from the date of its formation.

The Sub-Depot at Malavalli was continued and a sub-depot was newly opened at Darsanaguppe near French Rocks towards the close of the year. These sub-depots are in charge of Fieldmen.

Farms.—The Kodihalli Farm was started on 17th November 1932 and Mr. C. V. Ramiah was placed in charge of the operations. On his transfer as Superintendent of the Irwin Canal Farm, he was succeeded by Mr. H. G. Hanumiah Setty on 18th January 1933 and Mr. Hanumiah Setty was in turn succeeded by Mr. K. Krishnamurthi on 18th March 1933.

The Malligere Farm is in charge of the Farm Manager, Kodihalli Farm for the present. Work was started on this Farm on 18th January 1933.

The Satnur Farm was started on 22nd April 1933 and Mr. K. Nagesha Rao, Assistant Farm Manager, was first placed in charge of the Farm till the end of the official year.

3. *Leave.*—Mr. K. Basavaraj Urs, Agricultural Inspector, Maddur, was on privilege leave of 21 days from 3rd January 1933 to 23rd January 1933.

4. *Transfers.*—Mr. C. V. Ramiah, Agricultural Inspector, Mandya was transferred as Superintendent of the Irwin Canal Farm on 18th January 1933.

Mr. T. Rangaswami, Agricultural Inspector, Tumkur was transferred to Mandya Range on 3rd August 1933.

Mr. H. G. Hanumiah Setty, Agricultural Inspector, Mysore, was transferred as Farm Manager, Kodihalli Farm on 16th January 1933. He was again retransferred to Mysore Range as Agricultural Inspector on 18th March 1933.

Mr. K. Krishna Murthi, Farm Manager, Hebbal Farm was transferred to Kodihalli Farm as Farm Manager on 18th March 1933.

Mr. K. Nagesha Rao, Agricultural Insepctor, Babbur Farm was transferred as Assistant Farm Manager, Kodihalli Farm on 24th December 1932. He was later on transferred as Assistant Farm Manager of Satnur Farm on 22nd April 1933.

Mr. H. M. Subbiah, Agricultural Inspector, Chamarajanagar Range was transferred to Mandya Range on 30th January 1933. He was later transferred to French-Rocks Range on 28th April 1933.

Mr. H. Seshagiri Prabhu Agricultural Inspector, Nagamangala Range was transferred to Mandya Range on 6th May 1933.

Mr. G. S. Rangasamiengar, Agricultural Inspector, Hiriyur Range was transferred to Mandya Range on 17th March 1933. He was later transferred to Kodihalli Farm as Assistant Farm Manager on 7th May 1933.

Mr. H. Abdul Rahiman, Store Clerk of Babbur Farm was appointed as Assistant Farm Manager Malligere Farm from 8th February 1933.

5. *Correspondence.*—The correspondence of the Circle is heavy as the following figures indicate :—

Number of incoming papers	..	3,899
Number of outgoing papers	..	4,084

6. *Office and Depot Inspections.* No depot inspection could be conducted during the year on account of pressure of work. The Mandya Depot was audited by the Assistant Comptroller in January 1933. Depot inspections will be conducted during the current year.

7. *Seasonal conditions.*—There was an even distribution of rainfall during the year. Both hingar and mungar rains were timely. The effect of the hingar rains over the crops grown under irrigation for the first time in the Irwin Canal Tracts was marked and these crops yielded in consequence a good harvest.

The mungar Rains of 1933 were the first rains for the largely grown crops of Sugarcane. The earlier crops were immensely benefited by these rains but the few crops which were just then planted suffered heavily in germination. Mungar rains were also beneficial to Jola Crop.

The low prices of Agricultural commodities which characterised market conditions during the past two years continued throughout the year under report. But there was a new phase of development in this direction. Sugarcane alone of all the crops grown in this area was given a new footing in Agriculture when a fixed price was guaranteed for this crop with the advent of the Sugar Factory. Every ton of cane delivered at the Factory is guaranteed to be paid at Rs. 12 and the income from an acre of Sugarcane outbeats the income from any other crop grown by the raiyat. This measure was welcomed by many raiyats and they adopted sugarcane cultivation under the conditions stated in para 12 below.

8. *Demonstration and Sale of Implements.*—With the growth of sugarcane cultivation the use of Improved Implements by raiyats became very popular, under the credit sale system so generously sanctioned by the Government as is seen by the Implement sales from the depots of the Circle.

Among the various kinds of Implements special mention may be made of the Mysore Pattern Plough and the K. M. Pattern Plough manufactured at the Central Industrial Workshop, Bangalore. These have been specially designed to suit the work of Mysore soils. While they maintain the efficiency of the Mysore and the K. M. ploughs, they are lighter in draft and are easily workable by the usual grade of bullocks owned by the raiyats. These ploughs are highly popular as they are also cheaper than K. M. and Mysore ploughs.

A pamphlet dealing with the suitability of these ploughs to the Irwin Canal Area and with the use of certain other Implements, was published by the K. R. S. Working Committee and was widely distributed among the raiyats of the area.

In the initial stages of manufacture, the frog of the Mysore Pattern Plough was weak and this was seen under actual working conditions. Mr. Downing the Foundry Expert of the Central Industrial Workshop was shown the defects, and stronger frogs were manufactured and supplied thereafter. These new frogs are quite satisfactory in their work. Similarly the standards of the original consignments were weak, and thicker section standards were supplied thereafter.

The six shovel cultivator which was also manufactured at the Central Industrial Workshop became popular among sugarcane growers on account of its comparative cheapness. This costs Rs. 13 each while the K. M. Cultivator costs Rs. 14-14-0.

The sale of Implements during the year is appreciable. There was great demand for more implements but the issue of these for sugarcane Cultivation had to be stopped on account of limited supply of sugarcane setts.

9. *Work in Conjunction with Co-operative Societies.*—In connection with the development of Agriculture in the Irwin Canal Area, a Co-operative Society was started in Mandya, with the idea of affording credit facilities to the members so far as their agricultural needs were concerned. Implements worth Rs. 104-14-0 and seeds and Manure worth Rs. 1,802-1-6 were sold to the members from Mandya Depot on behalf of the Irwin Canal Co-operative Society. An Agricultural Loan of Rs. 2,500 has recently been sanctioned by the Government for this Society and it is expected that this institution will fill in the needs of the raiyats.

10. *Cultivation Methods.*—The most outstanding features of improved methods in cultivation by raiyats are :—

(1) the planting of Single setts instead of double setts
(2) the planting of setts in furrows instead of in pits
(3) Wider spacing for cane as per departmental instructions, *i.e.*, 3' apart in rows.
(4) Application of manures and artificial fertilisers in accordance with dosage prescribed by the Department.
(5) Sowing of high-yielding strains of Seed distributed from the Irwin Canal Farm, particularly H.G. 1 Groundnut G.E.B. 24 paddy, sugarcane, (H. M. 320.)
(6) The block system of cultivation.
(7) Growth of irrigated Dry crops.

11. *Manures.*—The use of artificial fertilisers was very widely adopted for paddy and universally adopted for Sugarcane. Statement III shows the sales of fertilisers from the depots of the Circle.

Crops.

12. (1) *Sugarcane.*—Sugarcane is the most important crop of the circle. It is grown by raiyats under "Oppige" for supply to the Sugar Factory at Mandya. An "Oppige" is a Document by which a raiyat agrees to grow the Varieties approved by the Department of Sugarcane on his lands and to deliver the same to the Sugar Factory at the agreed rate in consideration of the Department advancing him the necessary requirements. Statement IV gives the extent of cane grown by the raiyats.

In the growth of Sugarcane improved Varieties of Cane have been planted. The largest Variety is H.M. 320 but the other varieties had to be planted as the supply of H.M. 320 was found insufficient at the time. The area under other Varieties may not exceed more than about 200 acres in all.

In the scheme of Sugarcane Cultivation, there are two aspects of the matter. These are :—

1. Sugarcane Cultivation by raiyats.
2. Sugarcane Cultivation by Government on certain blocks of Government waste lands under the Maddur Branch of the Irwin Canal.

In the course of the system of rotation adopted under the Block System of irrigation Sub-block 2 was set apart for Cultivation of Sugarcane and other garden crops in 1933.

And, as a special case, owners of lands in Sub-block 3 also were permitted to grow sugarcane instead of paddy during 1933 as per Government Order No. 920-29 K.S.S. 3899-908, dated 9th January 1933. Planting of cane began in January 1933 and went on vigorously in February and March. Setts were mostly supplied from the Irwin Canal Farm and this supply was supplemented by purchases from Bangalore and Nanjanagud. The crops are very good.

As regards Sugarcane Cultivation on Government Lands, four blocks were selected in consideration of their proximity to Mandya and of their suitability in view of the Soil Surveys. Out of these, three blocks were taken up for Cultivation as shown in Para 13. The establishment of these Farms ensures a definite source of supply of raw material to the Sugar Factory at a time when raiyats' cane cannot be supplied, thus extending the crushing season. It is expected that this arrangement is going to keep the Factory working for eight months in the year, a period which is not worked by any factory in India.

(2) *Paddy.*—The advent of irrigation to this area marked the raising of paddy crop as the most practicable crop in the first year. Improved Varieties were highly poplular and G.E.B. 24 paddy was particularly grown by many raiyats, on account of two reasons. One of them is the high yield which has characterised this Variety, and another reason is the comparatively higher price which is offered for this variety in the market. Chintamani Sanna also was grown for its good yield and comparatively early maturity. The important source of seed was the Irwin Canal Farm.

(3) *Groundnut.*—Under conditions of irrigation prevailing here, Groundnut crop was grown round about Mandya. The most popular Variety is the H.G. 1 Groundnut. Eight thousand six hundred and thirty-five seers were distributed from Mandya Depot. This variety gave a good harvest. Being a commercial Crop and having in consequence a ready market, this crop is expected to become more and more popular.

13. *New Farms.*—Three new Farms were started during the year for sugarcane Cultivation. These are :—

1. Kodihalli Farm.
2. Malligere Farm.
3. Satnur Farm.

(1) Kodihalli Farm.

Cultivation of Sugarcane was begun on a commercial basis by the Department for the first time on the block of Government waste land near Kodihalli Village. Clearing work was begun on this Farm on 17th November 1932. This Farm is situated at a distance of four miles from Mandya in the north western direction. The Farm lands are served by the 10th distributory of the Maddur Branch of the Irwin Canal. The area of the Farm is 297-36 acres. The soil varies from fine red sandy loam to gravelly and stony types.

One mac Cormic Deering tractor with three-bottom tractor plough which was transferred from the Cattle Breeding Station, Ajjampur, was used for preparing the lands on all the three Farms to supplement the work of the bullocks. By the end of the year the whole area of the Farm was ploughed and 190-10 acres were planted. H.M. 320 sugarcane setts of the Irwin Canal Farm were used for planting.

One hundred temporary sheds were constructed for coolies and another group of temporary sheds was erected for bullocks. The climate of the place is malarial and many members of the staff and a number of labourers suffered from Malaria. Arrangements were made for the weekly visits of the Assistant Surgeon of Mandya, and the question of making this Farm a unit for anti-malarial measures is under correspondence. The sinking of a well for drinking water is in progress. Paris Greening is proposed to be experimented on this Farm in accordance with the views of the Consultant in health.

(2) Malligere Farm.

This Farm is situated at a distance of eight miles from Mandya in the north-western direction by the service road. The area of this Farm is 194-26 acres. The Farm lands

are fed by the 9th Distributory of the Maddur Branch. Work was started on this Farm on 18th January 1933. By the end of the year, the whole area was ploughed. Planting had not commenced during the year under report, but was taken up only in the first week of July 1933.

(3) SATNUR FARM.

This Farm is situated at a distance of three miles from Mandya in the North-eastern direction. The extent of the Farm is 291–15 acres. The Farm lands are served by the 17th Distributory of the Maddur Branch. Work was started on this Farm on 22nd April 1933. The whole area was ploughed up by the end of the official year and planting was begun only in July 1933.

14. *General.*—Due to exclusive concentration on sugarcane propaganda work, the other phases of Departmental Work could not be taken up. As far as possible, efforts are being made to push the agricultural Development work to all the villages without any exception and the village organisations and Co-operative institutions will be approached as usual for help in intensive propaganda.

K. M. GURURAJA RAO,
Assistant Director.

STATEMENT I.

Statement of Implements sold on the several ranges of the Mandya Circle during the year 1932-33.

Name of Implements	Mandya		Maddur		French-Rocks		Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount
		Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.
1 Mysore Pattern Ploughs	363	5,717 4 0	9	141 12 0	10	157 8 0	382	6,016 8 0
2 K. M. „ „	155	2,441 4 0	19	299 4 0	15	236 4 0	189	2,976 12 0
3 Mysore Ploughs ..	12	310 8 0	3	77 10 0	..	....	15	388 2 0
4 K. M. „ ..	..	....	11	217 4 0	..	....	11	217 4 0
5 Eureka „ ..	2	27 0 0	2	27 0 0	..	....	4	54 0 0
6 Verity „ ..	3	90 0 0	..	....	..	....	3	90 0 0
7 Cultivators	30	397 8 0	16	223 0 0	..	....	46	620 8 0
8 Spare parts	268	402 2 0	50	100 5 0	..	....	318	502 7 0
Total ..	..	9,385 10 0	..	1,086 3 0	..	393 12 0	..	10,865 9 0

STATEMENT II.

Statement showing the sale of seeds in the several ranges of the Mandya Circle during the year 1932-33.

Name of Seed	Mandya		Maddur		French-Rocks		Total	
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
		Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.
1 H. Gl. Groundnut	8,635 Srs.	471 8 0	2,717	172 14 0	..	....	11,352	644 6 0
2 G.E.B. 24 Paddy	515	41 3 4	1,014	54 6 8	..	....	1,529	95 10 0
3 Chintamani Sanna Paddy.	233	18 3 10	..	....	..	....	233	18 3 10
4 S236 Paddy ..	36	3 9 9	..	....	..	....	36	3 9 9
5 H.22 Ragi ..	85½	12 14 9	..	....	..	....	85½	12 14 9
6 Sunhemp ..	5	0 9 8	363	33 1 10	..	....	368	33 11 6
7 Sugarcane Setts ..	1,23,60,695	49,442 12 0	6,05,947	2,463 4 9	5,89,750	2,359 0 0	1,35,56,392	54,265 0 9
Total ..	..	49,990 13 4	..	2,723 11 3	..	2,359 0 0	..	55,073 8 7

STATEMENT III.

Statement showing the sale of Artificial Fertilisers in the several ranges of Mandya Circle during the year 1932-33.

Name of Fertiliser	Mandya		Maddur		French-Rocks		Total	
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
		Rs. a. p.		Rs. a. p.		Rs. a. p.		Rs. a. p.
1 Ammonium Sulphate.	450 tons 5 cwts	46,811 9 6	18 tons 12 cwts. 75 Lbs.	1,935 4 3	8 tons	830 0 0	476 tons 17 cwts 75 lbs.	49,576 13 9
2 Ordinary Superphosphate.	187 tons 1 cwt.	11,674 3 0	6 tons 13 cwts	415 10 0	5 tons 4 cwts.	340 8 0	198 tons 18 cwts.	12,430 5 0
3 Concentrated Superphosphate.	21 tons 4 cwts. 109¼ Lbs.	3,043 11 7	..	....	1 ton 4 cwts.	158 4 0	22 tons 8 cwts. 109¼ Lbs.	3,201 15 7
Total ..	..	61,529 8 1	..	2,350 14 3	..	1,328 12 0	..	65,209 2 4

STATEMENT IV.

Statement showing the area grown under Sugarcane for supply to the Sugar Factory up to end of June 1933.

Area of sugarcane crop in acres in.

Mandya	Maddur	French-Rocks	Colemanpet	Total
1,629-22	141-20	101-20 Area planted on Kodihalli Farm.	62-0	1,934-22 190-10
			Grand Total ..	2,124-32

STATEMENT V.

Statement showing the Budges of the Circle as from an extract from Government Order No. D. 3205-8—A. & E. 95-32-7, dated 5th January 1933.

FARMS.

	Rs.
Equipment :—	
Fifty pairs of bullocks at Rs. 175	8,750
Fifty ploughs at Rs. 16	800
Ten ridging ploughs at Rs. 60	600
Thirty cultivators at Rs. 12-8-0	375
Hand tools	1,200
Spare parts	1,000
Forty country carts	4,000
Total	16,725
Staff :—	
Four Farm Managers, 15 months on average pay of Rs. 127.5 ..	7,650
Four Assistant Managers, 15 months on average pay of Rs. 75 ..	4,500
Four clerks at Rs. 50 for 15 months	3,000
Twenty Maistries for 15 months at Rs. 20	6,000
Tractor Driver's allowance and cleaner for six months at Rs. 10 and Rs. 15 per month	150
Total	21,300
Buildings :—	
Bullock sheds	2,500
Store sheds	6,000
Staff Quarters	3,000
Maistries sheds, sheds for Bullockmen, etc., ...	6,000
Total	17,500
Labour	1,00,000
Manures at Rs. 60 per acre	54,000
Fodder and Feed for bullocks	10,000
Oil and fuel tractor 600 acres at Rs. 5 per acre	3,000
Total	2,22,525
or ..	2,25,000

MANDYA CIRCLE.

1.	Assistant Director of Agriculture on Rs. 250 plus Rs. 75 ..	(One)
2.	Accountant on Rs. 100	(One)
3.	Accountant on Rs. 50	(One)
4.	Clerk-typist on Rs. 30	(One)
5.	Peons on Rs. 11	(Four)
6.	Night Watchman on Rs. 11	(One)
7.	Fieldmen on Rs. 20	(Ten)

REPORT OF WORK DONE IN THE BOTANICAL SECTION FOR THE YEAR 1932-33.

PART I.—(GENERAL.)

I was in charge of the Botanical Section during the year. In addition to my duties I was also the Principal of the Mysore Agricultural School. The Seed Distribution Section was not revived during the year and part II of the Report is therefore not submitted. Details about the seed multiplication and distribution will be found in the reports of the Deputy and Assistant Directors. The demand for pure seed was very great and we were not able to meet a large part of it.

On the Hebbal Farm a few new Hain Ragi selections were found to be very promising and they are now being tested on the Hebbal Farm. Two of them will be given to the "A" farms for multiplication, if they give good results in the next season also. H. G. 1 was crossed with a number of other erect varieties and a large number of selections have been made in the hybrids. Several hybrids which were promising in the previous years have been multiplied for further tests. F_1 plants of the crosses between groundnuts and *Arachis nambyœuarœ* have been harvested and studied. The sugar-cane breeding work was revived and a large number of seedlings from P.O. J. 2878 have been raised and planted. Seedlings from other canes also are under observation. Potato breeding work also was revived. A number of new seedlings were raised and the selected ones of the previous years were multiplied and tested. About four of them are very resistent to ring disease and exhibit good keeping qualities. On the Nagenahalli Paddy Breeding Station a number of selections were under plot trials. A large quantity of nearly 60,000 seers of paddy was distributed for seed during the season. The demand for good seed is great but there is not sufficient space on the station to produce the required quantity. A few of the promising selections of Kar Pagi were sent out for preliminary trials and they have done exceedingly well on the trial plots in various places. The extension of cotton work on the Singapur Kaval is yielding valuable results for further work. The experiments on the wilt plot near Hiriyur have given useful information regarding the wilt resisting capacity of various strains and varieties of cottons. Paddy work on the Marthur Farm was continued and the promising selections were handed over to the Farm for further trials. In the Irwin Canal tract H. M. 320 sugar-cane has spread and is doing exceedingly well both as plant cane and first ratoon. The new seedlings H. M. 606 and 607 are making quite a vigorous growth on the Kodihalli and Irwin Canal Farms. Potato seems to be a very promising crop in the Irwin Canal tract as a rainy season crop. In the Laboratory at Bangalore groundnut crossing work was continued. The coffee seedlings raised from Congensis seeds secured from Java were sent to the Balehonnur Farm and they are reported to be making a good growth. Some seedlings have been raised from Costa Rica Coffee seeds and they will be transferred to Balehonnur.

During the year a detailed study of the hybrid sheep was made along with the Live Stock Expert and definite programme of work was prepared. Some interesting results are expected out of this new line of work before April 1934. I was on tour for 62 days during the year on inspection work.

V. K. BADAMI,
Economic Botanist.

REPORT OF WORK DONE IN THE BOTANICAL SECTION FOR THE YEAR 1932-33.

PART I.

Charge.—I was in charge of the Section during the year and was on tour for 62 days inspecting the Breeding Stations and Experimental plots.

Leave.—Mr. V. N. Ranganatha Rao was on privilege leave for two months and 29 days.

A. Hebbal Farm.—The total rainfall was 44.41 inches in 77 days against 29.95 in 62 days of the previous year. During the cropping season 39.35 inches fell in 75 days. In February two heavy showers giving nearly 3.98 inches helped greatly to prepare the lands early in the season. The actual cultivation season started after the first heavy fall of rain on the 19th of May. Long droughts followed by heavy rainfalls retarded the growth of crops.

Months	Total rain fall	Number of rainy days	Rain fall below								Rain fall above 2 inches	
			20 cents		50 cents		1 inch.		2 inches			
			Rain	Days	Rain	Days	Rain	Days	Rain	Days	Rain	Days
1. May ..	2.52	8	2.42	6	..	..	1.66	2	..	..	..	..
2. June ..	3.66	8	0.46	4	0.28	1	0.64	1	..	2	..	..
3. July ..	3.00	10	0.79	8	..	..	2.21	2	..	..	..	..
4. August ..	9.77	15	0.52	8	0.84	2	1.98	3	3.08	2	3.35	1
5. September	3.27	8	0.49	6	0.28	1	..	..	..	..	2.45	1
6. October ..	10.77	14	0.28	3	0.61	2	3.60	5	4.00	3	2.28	1
7. November .	6.55	10	0.25	3	1.50	4	..	..	2.74	2	2.06	1
8. December..	0.42	2	0.10	1	0.31	1	..	..	..	..	..	..
Total ..	39.95	76	5·31	39	3·82	11	10·09	13	9·82	9	10·14	4

I. Ragi.—Droughts and heavy rains alternating stunted the crop badly. The yields were low both in grain and straw :—

(i) Standard varietal tests	F4 Range B.	Percentage yield of graind
1. Local Hullubele (Check)	....	100.00—500 lbs. grain per
2. Madayyanagiri II	....	111.77 acre.
3. Do I	....	108.99
4. Jenumudda	....	86.76
5. Gudubele	....	82.56
6. Karigidda	....	90.12
7. Nayaragi	....	103.87
8. 310 (a) V. op. Branching	....	75.92
9. Hasarukambi	....	118.78
10. Rudrajade	....	95.59
11. Jadesangha	....	115.08
12. 310 (b) G. op. Branching	....	78.63
13. C. 33 White Ragi	....	73.42
14. C. 3 Majjige Ragi	....	65.47
15. C. 401 Hulragi	....	95.62

DETAILS *Vide* TABLE I.

2. *Pedigree Seeds* :—

Group 1.—In this group only three selections gave a slightly better results than the Local Hullubele.

F6 Range B.	Percentage yield of graind
Local Hullubele Check	100.0—183 lbs. per acre.
C. 322	100.5
C. 541 L.H.	103.0
H. 68	101.8

Detail *Vide* Table II.

Group 2.—In this group eight selections have given better result than the Local Hullubele. C. 391 and H. 77 have given very good results.

F8 Range B.	Percentage yield of grain.
Local Hullubele Check	100.00—813 lbs. per acre.
C. 351	107.76
H. 60	112.73
C. 391	146.52
C. 334	117.15
H. 77	124.22
H. 2	109.73
C. 526	115.57
H. 2 of Mg. II	107.95

DETAILS *Vide* TABLE III.

Group 3.—In this group only five have given better result than the Local Hullubele.:—

F10 Range B.	Percentage yield of grain.
Local Hullubele Check	100.00—625 lbs. per acre.
H. 21	116.27
H. 80	107.12
H. 77	100.98
H. 39	101.98
C. 357	102.17

Group 4.—In this group five have given better result than the local Hullubele :—

F12 Range B.	Percentage yield of grain.
Local Hullubele Check	100.00—800 lbs. per acre.
H. 75	118.81
C. 362	110.13
H. 82	100.20
C. 449	100.02
H. 71	103.08

DETAILS *Vide* TABLE IV.

Irrigated Ragies.—K1 was multiplied for distribution. This variety has given good yields in the Kar Ragi area as a dry land crop also and ripened early like other Kar Ragies.

General Collection.—All the ragies in the general collection were sown. The varieties received from East Africa were again sown for observation. They are very much like hain ragies but have dwarfish growth and ripen early.

II. GROUNDNUTS.

Varietal tests.—(1) Seventeen spreading varieties were grown in bulk plots. Only Sogatur, Senegal, Pondichery and Nigeria gave fair yields :—

Sogatur	729 lbs.	of dry pods	per acre.
Senegal	687	do	do
Pondichery	583	do	do

DETAILS *Vide* TABLE VI.

(2) Twelve erect varieties were sown in bulk plots and seven of them have given good yields.

H. G. 1	746 lbs.	of dry pods	per acre.
Tennessee white	661	do	do
Spanish	654	do	do
Small Japan	569	do	do
Spanish 18–38	546	do	do
Improved Spanish	539	do	do
African White	526	do	do

DETAILS *Vide* TABLE VII.

Plant selections.—Twenty four selections were multiplied. They will be tested in the next season.

Hybrids.—Twenty nine of the most promising hybrids were multiplied. They will be tested in the next season. The most promising ones are :—

Japandu 69	..	..	543 lbs. of dry pods per acre.
Spaniger 82	..	..	599 do do
Jatrans 14	..	..	760 do do
Jamavri 1066-227	..	..	452 do do
Jamys 553-127	..	..	417 do do
Erect Pigmy 30	..	..	484 do do
Jabig 117	..	..	429 do do

The following hybrids have given over 2 000 lbs. of haulms fit for fodder to the acre :—

Japandu 69	..	..	2,940 lbs. per acre.
Pigmy 28	..	..	2,352 Do do
Jamys 553-127	..	..	2,352 do do
Jatrans 14	..	..	3,528 do do
Erect Pigmy 30	..	..	2,940 do do
Japandu White Pigmy	..	..	2,744 do do

III. *Potato.*—Twenty five seedling varieties were tested during the year. There was no ring disease in the plots. B. Q. 36 has again given the best result. The following seven have given over or nearly 7,500 lbs. of tuber per acre or 300 mds. (1 md=25 lbs.)

B. Q. 36	..	..	1,1071 lbs.—443 mds.
G.	..	..	10,284 „ 411 „
A.	..	..	8,712 „ 348 „
No. 284	..	..	7,773 „ 311 „
B. Q. 10	..	..	7,623 „ 305 „
N.	..	..	7,469 „ 299 „
No. A & B-C.	..	..	7,895 „ 315 „

The following have given good yields and seem to be resistant to ring disease also to some extent B. Q. 39 5 B.T. and No. 384.

New Seedlings.—Some ripe fruits were available near Hebbal in one of the gardens. The seeds were saved and 780 seedlings were raised and transplanted. Only 292 reached maturity and formed small tubers. Selections have been made for planting in the next season.

Bulk Trials of British Queen Potato.—Fresh stock of seed potatoes from Scotland were bought from Mr. C. Laxmana Rao, L. Ag. The general growth was very good. The plot was manured with 24 cart-loads of Farm yard manure and artificials at the rate of 300 lbs. of Ammonium Sulphate, 600 lbs. of Super and 300 lbs. of Potassium chloride per acre. The total yield per acre was 509 maunds. The plot was badly attacked by the epilachna beetle, but it was kept in check by spraying.

Shade and Potato Growth.—To test the effect of partial shade on the potato growth and production of tuber formation two alternate plots were covered over with cocoanut leaves spread over a low pendal roofing about 3 ft. from the ground. There was always a filtered sunlight playing on the plants. In the beginning, the growth of plants under shade was remarkable and the plots did not require frequent irrigations. Later it was found that stems were tall, lean and lodged badly. On the other hand plants in the open plots were vigorous, dwarf and strong stemmed. The yield under shade was only half that in the open plots. Shade not only decreases the yield and prevent the formation of big tubers but it also prolongs the period of growth by nearly

three weeks. Plenty of good sunlight seems to be quite essential for the formation and development of big tubers :—

Variety of potato—British Queen.
Planted on 12th January 1933.
Harvested in 94 days.

Total area of 2 plots	Experiment	Number of plants	Dry wet of plants	Number of tubers			Wt. of tubers		
				Big	Medium	Small	Big	Medium	Small
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
30′ × 10′ ..	Open plots ..	217	16.0	200	452	1290	38.0	46.00	42
30′ × 10′ ..	Shaded plots ..	264	12.5	160	373	715	18.5	30.25	15

Yield per acre :—

Open plot .. .. .. 750 mds.
Shaded plot .. .. .. 375 do

Indications are that shade is harmful and that full sunlight is necessary for a maximum production of tubers.

IV. *Castors.*—Thirty-six selections and 27 plant selections were all maintained. The following six selections have given good yields during the year :—

Variety	Yield per acre in lbs.
H. 5	749
H. 1	656
H. 2	651
H. 7	566
H. 3	527
H. 4	509

V. *Avares and Grasses.*— Avare work was not taken up during the year. The dry land grass *P. Purpurium* was multiplied and supplied to other places specially to the Cattle Breeding Station at Ajjampur. All the other grasses have been maintaned. Two Australian grasses (1) *Phalaris stenoptera* (a strain out of P. tuberosa). (2) *Phalaris coerulescens* tested during the year have grown up but they seem to be too delicate for our conditions here. Even under irrigation they are not making satisfactory growth. Kudzu from Japan has been growing for over a year. The vine is strong but it has not yet flowered. The Sorghum Amber was found to vary very much in its quality. Plant juices tested gave from 4 per cent to 16 per cent brix reading. Better grades have been selected for multiplication. Teosente has been growing very well as a fodder crop during the monsoons. It does not stand water logging and it seeds freely here.

Wet Area.—There was sufficient water in the tank during the year and the sugarcane and paddy crops were good.

Sugar-cane.—H. M. 320 cane is getting popular and is now extending rapidly in several parts. In Challakere it was found to resist borer attack better than H. M. 544 or Local Rasthali. It ripens earlier than H. M. 544 and produces better jaggory than H. M. 544 which is a late cane. In Mandya area H. M. 320 has been planted over nearly 2,500 acres.

P. O. J. 2878 and E. K. 28 have again given low yields and flowered early in the season. Even when they are planted in June they flower in October after seventeen months. Attempts were made to test the effect of planting in June, July, August, September, October and it was found that the climate of Bangalore is not suited for such seasonal plantings. The soil is wet and cold, the percentage of germination is very low and the wet rainy weather retards the growth of young canes during the monsoons. The succeeding hot months check further growth. Since after the formation of the cane there is a period of twelve months to grow and the canes do not flower there is a slight increase in tonnage. But June planting interferes with the general rotations

on wet lands and it is not possible to adopt it. A large number of new caneshave been introduced during theyear :—

Java Canes ;—

Sorghum—sugar- cane crosses from Coimbatore.

1. P. O. J. 2727	7. CO. 356,
2. P. O. J. 2883	8. CO, 351
3, E. K. 2	9. CO. 353
4, CO. 350,	10. CO. 355
5. CO. 352,	11. CO, 357
5. CO. 354,	

U. S. A :—

Thick canes from Coimbatore.

Scaly Seedling ..	..
South America ..	.. CO. 401, CO. 402
D. 1135	.. CO. 403 & CO. 404
D. 1135 Striped ..	..
Queensland 813 ..	..

All these have flowered before the end of October and they are not suitable to us. The sugar-cane Sorghum crosses began to form canes only after six months.

New Seedlings.—H. M. 606 and H. M. 609 and H. M. 607 were very promising and they were planted in test plots during the year. The last two are seedlings of crosses between H. M. 544 and P. O. J. 213. H. M. 608 one of the seedlings from H. M. 89 was found to be extremely rich this year also. Some individual canes indicated as much 28.6° Brix. Complete analysis of the cane gave the following figures. This is the richest cane we have raised during the last 20 years and it is making a good growth in Mandya :—

Brix	.. 26.22
Sucrose	.. 25.41
Glucose	.. 0.087

Fresh Seedling.—During the year 226 selections were made out of the previous years seedlings and planted as cut canes. Twenty-two thousand, two-hundred and fifty new seedlings were planted during this year. The variations in the seedlings raised from P. O. J. 2878 are great and it seems to be a very good parent for further breeding work.

Imperial Research Council.—The scheme submitted to the Imperial Research Council was sanctioned during the year. The following two officers were appointed in February 1933. Dr. L. S. Doraswami, B. SC., (HONS.) M. SC., (LOND.) PHD., (LOND.) was appointed as Senior Assistant Botanist and Mr. M. L. Subbanna B.SC. (HONS.) was appointed as Junior Assistant Botanist. It is proposed to submit the report on Sugar-cane work as a separate report (*vide* part 8).

Paddy Work on the Marthur Farm.—The twelve varieties tested show that in general they are all low yielders both in grain and straw.

Varieties	Grain per acre in lbs.	Straw per acre in lbs.
1. *Malnad Varieties.*		
Hosalli Bile	960	1,720
Siddasale	980	1,480
Dod Bile	1,020	1,720
Hasadi	880	2,480
Alur Sanna	800	1,880
Bhave	1,080	1,560
Somasale	1,040	1,900
Togarina	1,320	2,120
Jeddu	1,260	2,500
Musally	1,300	2,860
G. E. B. 24 (Check)	1,040	1,900
2. *Java Varieties.*		
Gabah Rosaki	1,280	3,400
Gabah Temas	1,120	2,400
Gabah Skivimankotte	1,360	3,340
Gabah Tijimma	1,430	2,820

In general the Java varieties are better yielders in grain and decidedly superior to local varieties as yielders of straw, a point which is important for the Malnad taluks were fodder is scarce.

Plant Selections.—Nineteen promising plant selections have given very encouraging results. Some of them are exceedingly good as straw yielders in addition to giving good yields of grain :—

Varieties	Grain per acre in lbs.	Straw per acre in lbs.
Walya 3629	2,440	4,260
Walya 529	2,340	3,920
H. O. 629	2,180	3,960
Si. 1029	2,340	5,320
H. O. 529	2,380	3,920
H. B. 829	2,120	5,700
H. B. 229	2,000	3,940
D. 329	2,240	4,620
T. 129	2,100	3,300
Si. 1329	2,740	4,740

A large number of plant selections have been maintained in line cultures. The most promising ones will be released for distribution if they do well in the next season also.

The percentage of rice to grain varies very much in varieties and even in plant selections made in the same variety. An attempt has been made to isolate varieties giving high percentage of rice to paddy.

Variety	Per cent Rice to Paddy	Variety	Per cent Rice to Paddy
Walya	50.0	Honase	43.7
Walya 1129	37.5	Do 529	50.0
Walya 429	50.0	Do 629	56.2
Hosallibile	43.7	Do 829	50.0
Do 229	50.0	Do 1029	53.1
Do 829	46.9	Hasadi	46.9
Do 1529	50.0	Do 1129	53.1
Do 1629	46.9	Do 2129	34.3
Do 1729	53.1	Alur Sanna	50.0
Do 1929	50.0	Do 229	53.1
Togarina	46.9	Do 1029	43.7
Do 1529	50.0	Do 1129	53.1
Do 129	43.7	Dodhile	37.5
Bhave	50.0	Do 129	46.9
Bhave 2429	50.0	Do 329	46.9
Bhave 4429	43.7	Do 2229	37.5
Siddasale	50.0	Jeddu	43.7
Do 129	46.9	Mulhegge	40.0
Do 1129	50.0	G. E. B. 24	56.2
Somasale	43.7	Gabah Tijimma	53.1
Do 729	50.0	Gabah Temas	53.1
Do 829	53.1	Gabah Rosaki	50.0
Do 1329	50.0	Gabah Skivimankotte ..	46.9

Irwin Canal Farm.—The trial of crops in various seasons was continued. Many of them are not suited as summer crops whereas the rainy season seems to suit all crops.

1. *Groundnuts.*—Valencia sown on 20th August was harvested on the 28th of November. The yield was 1439 lbs. of pods per acre. H. G. No. 1 variety was sown on the 17th of August and it was harvested on the 18th of December nearly three weeks after Valencia. The yield was 701 lbs. of pods per acre. It did not do as well as it did in summer when nearly 2800 lbs. were harvested in this variety on a raiyat's field.

2. *Wheats.*—Dharwar variety was sown on the 23rd of September and harvested on the 6th of February. The growth was not good and only 166 lbs. of grain were harvested per acre. There was a mild attack of rust.

3. Kaphile wheat was sown on the 20th of November. The crop was harvested on 6th of March. The yield was 512 lbs. per acre but the crop was very badly attacked by rust. The rust samples were sent to Dr. K. C. Mehtha, Professor of Botany, Agra College. Slides are being exposed for him in the aeroscope at Hebbal, Babbur and on the Irwin Canal Farm since last year.

Cottons.—Nine varieties were tested. Cambodia 440, Strain 295, Gadag No. 1, 4 F. 98, 285 F. 21 Boss 16, Asboni 37, Sakal and Sea Island. Gadag No. 1 and 4 F. 98 had the most vigorous growth. Cambodia 440 was fair. The others were all a failure.

4. British Queen Potato was planted and the crop had made a very good growth. There were no diseases of importance.

5. Irrigated types of ragies succeeded well in both summer and rainy season.

6. Tobacco as a semi rainfed crop with occassional irrigation was very successful.

7. *Miscellaneous crops.*——

(*a*) Cereals :—

Sajje ..	These can be grown as rainfed crops.
Navane	
Haraka	
Same ..	
Jola	
(*b*) Chitra cholam of Coimbatore ..	Grows well as a summer irrigated crop.

(*c*) Legumes :—

Cluster Beans	Four types grow well in the rainy season.
Three varieties of cowpeas	
Lentil	

Two Bengal gram varieties from Pusa All these were not quite satisfactory even in the rainy season.
Field peas.

(*d*) Java Soy Beans made a good growth in the rainy season.
(*e*) Two Pusa varieties of Sesamum failed.

Sugar-canes.—All the varieties of sugar-cane growing on the Hebbal Farm have been transferred to this place and planted. Several seed beds were sown with sugar-cane seeds. Many seeds germinated but they all died later. Selections of seedlings raised from H.M. 544 × P. O. J. 213 crosses were tested on a small scale. Many of them are promising and they have been planted in larger plots for multiplication. H. M. 606 and 607 are full of promise here. In general the rate of growth of sugarcanes is very much greater here than at Hebbal. In the seasonal plantings in April and May were very badly damaged by borer attack. The ratoons of H. M. 320 cane after the trash in the field is burnt has come up well. The second ratoon is not successful. The friable, well drained soils are suitable for planting from June to March. It is possible here to plant for ten months in the year and by planting varieties which take different duration to ripen, the milling season can be considerably spread over a larger period in the year than in other parts of India.

Laboratory work.—There are three research students working in this section at present.

1. Mr. K. Shama Iyengar, B. sc., is working on paddy nutrition experiments on the Hebbal Farm.

2. Mr. L. Narasimha Murthy, B. sc., is working on groundnut hybridization work. He made several successful crosses and has made a number of selections in the F2 generation.—

1. ♀ H. G. No. 1 × Valencia —♂
2. ♀ H. G. No. 1 × Tennessee ——♂
3. ♀ Tennessee × Valencia —♂
4. ♀ Tennessee × H. G. No. 1 —♂
5. ♀ Valencia × H. G. No. 1 —♂

Several successful croses have been made by Mr. Narasimha Murthy between *Arachis Nambyquarensis* × Groundnut varieties :—

Arachis Nambyquarensis ♂ × ♀	1.	H. G. No. 1
	2.	H. G. No. 2
	3.	Valencia
	4.	Spanish
	5.	Virginia

3. Mr. K. Narasimhachar, B. Sc., is continuing his work on the study of crotolarias of Mysore.

Mr. K. Subba Rao, B. Sc., Agricultural Inspector was in charge of the teaching work at Hebbal and worked in the Mysore Dasara Exhibition.

It gives me great pleasure to acknowledge the help given by the staff and students during the year.

V. K. BADAMI,
Economic Botanist.

TABLE I.

Variety. II. B. Field 4—Ragi

Sown on 2-7-1932. Germination on 6-7-1932. Harvested on 30-11-1932.

Sl. No.	Variety	Type	Average yield per acre in lbs.		Percentage yield	
			Grain	Straw	Grain	Straw
			lbs.	lbs.	lbs.	lbs.
1	Local Hullubele (Check) ..	Green open ..	499·83	896·53	100·00	100·00
2	C. 2 Madayyanagiri II ..	Green loose ..	524·99	846·66	111·77	97·53
3	C. 1 do I ..	Violet open ..	464·44	883·33	108·99	112·90
4	C, 10 Jenumudda	Green compact ..	404·26	758·89	86·76	97·63
5	C. 8 Gudubele	Do ..	413·61	727·22	82·56	88·11
6	C. 71 Karegidda	Violet open ..	527·22	997·22	90·12	99·85
7	C. 39 Nayaragi	Violet compact ..	530·55	850·00	103·87	108·68
8	C. 310 (a) V. Op. Branching ..	V. op Branching ..	405·55	835·55	75·92	87·59
9	C. 9 Hasarukambi	Green open ..	490·55	894·55	118·78	111·12
10	C. 11 (a) Rudrajade	Violet compact ..	454·99	777·77	95·59	91·85
11	C. 11 (b) Jadesangha ..	Green compact ..	601·66	921·11	115·08	99·72
12	C. 310 (b) G. Op. Branching ..	G. Op. Branching ..	407·22	793·85	78·63	84·25
13	C. 33 Majjigae	White open ..	457·22	731·67	73·42	86·01
14	C. 3 do	White compact ..	322·77	727·77	65·47	81·04
15	C. 401 Hulragi	Green open ..	496·66	815·55	95·62	84·78

TABLE II.

II. B. Field 6. Ragi

Sown on 3-7-1932. Germination on 6-7-1932. Harvested on 30-11-1932.

Sl. No.	Variety	Type	Average yield per acre in lbs.		Percentage yield	
			Grain	Straw	Grain	Straw
			lbs.	lbs.	lbs.	lbs.
1	Local Hullubele (Check) ..	Green open ..	584·14	770·18	100·00	100·00
2	H. 45 Hullubele	Do ..	542·32	851·33	90·53	99·37
3	H. 55 L. H.	Do ..	505·33	772·33	84·85	91·16
4	H. 64 Hullubele	Do ..	505·00	821·67	79·61	93·61
5	C. 463 Dodda	Do ..	649·00	884·67	94·55	92·23
6	C. 322 do	Do ..	697·33	1032·33	100·56	111·53
7	C. 528 Hain	Do ..	569·33	840·00	90·52	97·31
8	C. 425 Bile Ragi	Do ..	518·33	805·00	96·11	93·44
9	C. 446 Hullubele	Do ..	533·67	756·00	87·84	84·42
10	C. 541 L. H.	Do ..	614·33	928·67	103·03	104·80
11	C. 543 L. H.	Do ..	567·33	786·67	96·17	91·64
12	H. 68 L. H. P. S.	Do ..	597·33	893·00	101·79	108·81
13	C. 357 Bile Chowliga ..	Do ..	588·33	862·00	98·59	107·64
14	C. 535 L. H.	Do ..	541·00	856·00	92·97	102·06
15	H. 2 or Mg. II	Do ..	551·33	819·67	98·08	106·57

TABLE III.

II B. Field 8. Ragi

Sown on 2-7-1932. Germination on 6-7-1932. Harvested on 1-12-1932.

Sl. No.	Variety	Type	Average yield per acre in lbs.		Percentage yield	
			Grain	Straw	Grain	Straw
			lbs.	lbs.	lbs.	lbs.
1	Local Hullubele (Check) ..	Green open ..	813·00	1226·23	100·00	100·00
2	C. 351 Biledodda	Do ..	902·33	1401·33	107·76	102·86
3	H. 40 Hullubele	Do ..	502·67	780·67	64·57	60·63
4	H. 60 Mixture	Violet open ..	828·67	7191·00	112·73	100·88
5	H. 94 Hullubele	Green open ..	720·00	1080·33	97·89	95·02
6	C. 391 Hain	Do ..	1069·67	1472·33	146·52	126·92
7	C. 334 Bile Ragi G. Loose ..	Do ..	867·33	1529·33	117·15	129·25
8	C. 514 Hain	Do ..	696·33	1055·67	88·93	84·75
9	H. 19 Dodda Ragi	Do ..	709·67	1045·00	89·10	83·40
10	H. 13 or Mg. II—4	Do ..	712·00	1018·67	85·05	80·58
11	H. 32 or D. 1-18-5	Do ..	618·67	1018·00	77·20	81·55
12	H. 77 L. H.	Do ..	1008·00	1505·67	124·32	118·71
13	H. 2 or H. 2-28	Do ..	914·33	1317·67	109·73	103·31
14	C. 526 Hain	Do ..	965·03	1428·00	115·57	109·69
15	H. 2 or Mg. II	Do ..	870·67	1250·00	107·95	99·76

TABLE IV.

II. B. Field 10. Ragi

Sown on 3-7-1932. Germination on 7-7-1932. Harvested on 30-11-1932.

Sl. No.	Variety	Type	Average yield per acre in lbs		Percentage yield	
			Grain	Straw	Grain	Straw
			lbs.	lbs.	lbs.	lbs.
1	Local Hullubele (Check) ..	Green open ..	625·11	807·07	100·00	100·00
2	C. 530 Hain	Do ..	603·99	992·22	89·24	104·17
3	H. 81 L. H. P. S. ..	Do ..	774·99	1081·33	116·27	126·42
4	H. 59, Mg. II 4	Do ..	581·78	879·55	87·39	106·29
5	H. 3. Hullubele	Do ..	572·22	903·11	87·24	109·86
6	C. 469 do	Do ..	559·11	862·00	93·05	105·84
7	H. 46 do	Do ..	523·55	846·22	85·55	107·19
8	C. 349 Hain	Do ..	543·55	938·99	92·06	121·81
9	H. 80 L. H. P. S.	Do ..	615·99	928·44	107·12	121·67
10	H. 77 do	Do ..	597·72	865·33	100·98	114·45
11	C. 389 Green Loose ..	Do ..	591·11	885·11	87·81	115·77
12	H. 39 Hullubele	Do ..	636·41	925·33	101·98	118·42
13	C. 339 Koppada Ragi ..	Do ..	594·67	908·89	97·60	115·22
14	H. 73 L. H. P. S.	Do ..	551·99	893·33	93·66	112·52
15	C. 357 Bile Chowliga ..	Do ..	603·99	934·67	102·17	116·79

TABLE V.

II. B. Field 12. Ragi

Sown on 3-7-1932. Germination on 7-7-1932. Harvested on 1-12-1932.

Sl. No.	Variety	Type	Average yield per acre in lbs.		Percentage yield	
			Grain	Straw	Grain	Straw
			lbs.	lbs.	lbs.	lbs.
1	Local Hullubele (Check) ..	Green Open ..	800·70	1036·51	100·00	100·00
2	H. 92 Hasarukambi ..	Do ..	807·22	1219·44	93·73	115·72
3	H. 75 L. H. P. S. ..	Do ..	964·44	1500·55	118·81	138·12
4	C. 362 Bile Chowliga ..	Do ..	929·44	1366·66	110·13	124·36
5	H. 82 L. H. P. S.	Do ..	866·66	1301·67	100·20	117·72
6	C. 462 Kaddimurukalu .	Do ..	806·67	1116·66	94·10	102·12
7	H. 18 Dodda Ragi	Do ..	856·11	1184·88	96·56	105·49
8	C. 426 Bile Ragi	Do ..	629·99	1037·22	77·18	94·87
9	C. 417 Mg. II	Violet Open ..	545·55	954·44	71·24	94·45
10	C. 537 Hullubele	Green Open ..	725·55	1126·66	98·04	115·90
11	C. 449 Dodda	Violet Compact ..	784·44	1219·44	100·02	122·84
12	C. 358 Karebundiga	Violet Open ..	722·78	1022·22	94·48	106·71
13	C. 688 Hain	Violet Compact ..	560·55	941·99	80·94	100·70
14	H. 71 Hasarukambi	Green Open ..	760·83	1164·33	108·08	118·91
15	H. 2 or Mg. II	Do ..	717·50	1105·83	98·18	115·42

TABLE VI.

II. B. Field 3.

Groundnuts—Spreading Varieties.

Sown on 19-7-1932. Germination on 25-7-1932. Harvested on 9-12-1932.

Sl. No.	Variety	Number of plants for 12 /1500 Acre	Yield per acre in lbs.	
			Pods	Herb.
1	Sogatur	950	729·16	3041·66
2	Refisque Senegal	858	416·66	2083·33
3	Big Japan	890	479·16	1458·33
4	Mauritius	670	437·16	1500·00
5	Carolina	850	416·66	2166·66
6	Barbodas	950	416·66	2000·00
7	Senegal	855	687·50	1875·00
8	Virginia	750	333·33	1625·00
9	Mozambic	910	479·16	1666·66
10	Brazil	880	458·33	1833·33
11	Bassi	830	479·16	1250·00
12	Tatas	845	375·00	1666·66
13	Raipur	780	479·16	1791·66
14	Pondichery	885	583·33	1666·66
15	Nigeria	560	500·00	1458·33
16	Transvaal	735	489·58	1453·33
17	Mysore Local	670	218·75	2291·66

TABLE VII

II. B. Field 5.

Groundnuts—Erect Varieties.

Sown on 20-7-1932. Germination on 26-7-1932. Harvested on 18-11-1932.

Sl. No.	Variety	Number of plants for 2 /1115 Acre	Yield per acre in lbs.	
			Pods	Herb
1	African Red	493·50	424·06	1437·50
2	African White	1365·00	526·56	908·75
3	H. G. 1	1306·50	746·88	2587·50
4	H. G. 2	319·00	258·75	920·00
5	Valencia	885·00	402·50	833·75
6	Small Japan	1415·00	569·68	1207·50
7	Spanish	1220·00	654·06	1552·50
8	Tenessee White	1265·00	661·25	1610·00
9	Spanish 18-38	1030·00	546·25	1265·00
10	Bunch Virginia 10427	617·00	316·25	1523·75
11	Do 10027	217·00	244·37	1265·00
12	Improved Spanish	1057·50	539·06	1563·75

REPORT OF WORK DONE ON THE BABBUR FARM IN THE BOTANICAL SECTION FOR THE YEAR 1932-33.

PART III.

Charge.—Mr. B. Venkoba Rao, B. Sc., was in charge of the work at Babbur and Singapur Kaval. He was on tour for 34 days during the year.

Seasonal Conditions.—The rain-fall was 29·13 inches against 13·29 inches in the previous year; an increase of 15·84 inches and the heaveist during the last ten years. Doddabathi was sown in the early part of August and the heavy rains in August facilitated early sowings of Sannabathi on the dry lands.

Cotton.—An attempt has been made to make a collection of all available varieties of indegenous and exotic cottons. Many of them have been sown during the year. They will afford material both for comparative study and hybridization work.

A. *Sannabathi.*—Pure seed of S. 69 multiplied by the section was handed over to the Farm for further multiplication. About 50 maunds of pure S. 69 were given out by the Farm to the "A" farms. Maradihally Farm was the most successful one during the year. The rapid increase of area under S. 69 calls for opening new "A" farms to produce large quantities of pure seed.

Wilt Resisting Varieties.—S. 69 is spreading in Hiriyur and Chitaldrug ranges. The wilt disease which was first noticed at Metikurke and Ghannayakanahally in Hiriyur Taluk is reported to have gradually spread to other surrounding villages. The cultivators have taken to D. 2 in many places though it is inferior to S. 69 in many respects for it seems to resist wilt to a great extent. The work of evolving wilt resistant varieties is being continued. Last year 21 individual plant selections from among the Arboreum crosses and 29 from among Nadam × Cernum crosses were sown in the wilt plot and carefully studied.

Plot trials were conducted both in the "Strip" and "Latin square" methods to test the wilt resisting power of various varieties and hybrids raised on the Farm by Mr. V. N. Ranganatha Rao.

Two strains Gr. 69-70 and 76-77 which were selected in 1930-31 as promising ones have given a fairly good stand and maintained their quality but the yields are very low compared with D. I or Jayavant.

In 1931-32 the Yields of the varieties in the wilt plots were as follows :—

Dharwar No. 2 (D2)	.. ..	336 lbs. Per Acre.
Arboreum 76-77 ..	.. ..	213 Do
Nadam-like 21-22	.. ..	225 Do
Selection 69 ..	.. ..	187 Do

In 1932-33, the following results were obtained :—

No.	Variety	Plots—latin sq. of Seed cotton	Plots—Strip of Seed cotton
1	Dharwar No. 2 (D2)	850 lbs. Per Acre	618 lbs. Per Acre.
2	Jayavant	715 Do	....
3	S. 69	426 Do	335 Do
4	Nadam-like 149-152	361 Do	203 Do
5	Nadam-like 21-22	274 Do	262 Do
6	Arboreum 76-77	270 Do	301 Do
7	Herbaceum-like 190	91 Do	99 Do
8	Arboreum 68-70	....	97 Do

Every attempt is now being made to get a variety not only to resist wilt but also to produce high yields of lint of good quality.

Tests of Hybrids.—About 69 selections made among the hybrids of G. Arboreum X. G. Herbaceum crosses raised by Mr. V. N. Ranganatha Rao were sown and studied. About seventeen of them have been selected for further tests.

Five of the most promising ones were sent to the Technological Laboratory, Matunga, Bombay, for report. Graders report, fibre tests and other particulars are given below :—

	Strain 190	Strain 21-22	Strain 149-152	Selection 69	Selection 69-1	Selection 69-3
Contract valued under	Broach	Broach	Broach	Broach	Broach	Broach
Class	Extra Super-fine	Extra Super-fine	Extra Super-fine	Extra Super-fine	Extra Super-fine	Extra Super-fine
Colour	White	White	White	White	White	White
Staple Length ..	1"	Full 1"	$\frac{7}{8}$"—1"	..	$\frac{3}{4}$"	31/32"
Staple Strength ..	Fair	Fair	Fair	Poor	Poor	Fair
Regularity	Fair	Fair	Poor	Poor	Fair	Fair
Value above or below contract rate.	Rs. 40 on	Rs. 40 on	Rs. 15 on	Rs. 15 on	Pass	Rs. 40 on
Basis	Rs. 218	Rs. 218	Rs. 218	Rs.193	Rs. 193	Rs. 193
Date of valuation ..	7-11-32	7-11-32	7-11-32	10-12-32	10-12-32	10-12-32
Remarks	..	..	..	..	..	..

ii. Fibre Paticulars.

	Strain 190	Strain 21-22	Strain 149-152	Selection 69	Selection 69-1	Selection 69-3
Fibre Length in :—						
(*a*) By balls sorter ..	0·96	0·90	0·82	0·86	0·88	0·95
(*b*) By bear sorter ..	0·88	0·88	0·79	0·88	0·88	0·92
Fibre w.t. per in :— *Millionth of an in.*	0·189	0·179	0·171	0·209	0·224	0·210

iii. Remarks.

The mean fibre length of the Strain 190 is much greater than that of the Strain 149-152 but singular to note that is it decidedly also much coarser. The Strain 21-22 lies mid-way between its two neighbours in both fibre properties, *i.e.*, of length and weight. The Strain 149-152 is not quite so regular in fibre length as the other two cottons but on the whole, there is very little to choose in effective difference in the three cottons. As regards Selection 69 and its further selections, Selection 69-3 is 7 per cent longer than the other two which have approximately the same mean fibre length. Selection 69-1 is slightly coarser than the other two strains but all the three Strains have this in common that they are rather coarse for their length.

iv. Spinning Master's Report.

Strain 190.—The cotton is creamy white in colour; very bright, very clean, has a *good bodied feel*; well ginned, a very desirable sample. The card sliver is clean and web even and Nep-free.

Strain 21-22.—The cotton is creamy white in colour; brightish, clean, has a *good bodied feel;* well ginned. The card sliver is clean, web good and free of nep.

Strain 149-152.—The cotton is white to creamy, white in colour, brightish, a trifle leafy, well ginned. The card web is good and sliver clean.

Selection 69 (*Pure*).—The cotton is white to creamy white in colour, bright, clean, has a good but *slightly harsh feel*, well ginned. The card web is good, sliver, clean and ten flat strips weigh 10·1 grammes.

Selection 69-1.—The cotton is white in colour, clean, has a *slightly harsh feel*, well ginned. The card sliver is clean, web good and ten flat strips weigh 11·3 grammes.

Selection 69-3.—The cotton is white in colour, bright, clean, has a *slightly harsh feel*; well ginned. The card web is even and nep-free sliver clean and ten flat strips weigh 9·9 grammes.

Yarns.—The yarns of Strain 190 are, count for count, as even as those of strain 149-152 and a little less neppy. The yarns of the latter (Strain 149-152) are similar to those of Strain 21-22 in the property of neppiness but a little more even in the higher counts. The 24's yarn spun from the other two Selection 69 strains are "even to fairly even."

Standard Yarn Counts.—The highest standard yarn counts assigned to these three cottons are as follows :—

Cotton	Highest Standard Yarn Counts
Strain 190	35′ S.
Strain 21-22	32′ S.
Strain 149-152	30′ S.
Selection 69 (pure)	23′ S.
Selection 69-1	19′ S.
Selection 69-3	27′ S.

Some of the most promising ones were tested against Local Sannahathi. Both the "Strip method" and the "Latin square method" were adopted for sowing. The following table gives the results :—

TABLE YEILD TESTS.

No.	Variety	Strip method		Latin square method
		Yield per acre Seed cotton	Percent Ginning	Seed cotton
		lbs.	Per cent.	lbs.
1	Local Sannahathi	696	23·10	569
2	S. 69	611	23·85	708
3	S. 69-1	404	30·27	571
4	S. 69-3	454	28·10	552
5	Nadam	611	17·60	640
6	Nadam Like 21-22	392	22·50	506
7	Nadam Like 149-152	418	24·90	460
8	Herbaceum Like 190	452	28·50	547

S. 69, Nadam and Local Sannahathi still stand at the head of the list. Further selection from S. 69 seem to be a source of promising strains. A large number of selections have been made in S. 69 for early maturity and high yield.

Nadam Cernum Crosses.—There were in all about 47 selections made in the F. 4 generation. The crosses were made by Mr. V. N. Ranganatha Rao and subsequently the first selections were made by him. The following five are the best of them and their performances in the test plots for yield resistance to wilt and other characters will be watched :—

1. 391-92 .. .. Divided leaf, yellow flower, white seed.
2. 345-49 .. .. .. Divided leaf, white flower, white seed.
3. 365-68 .. .. .. Do do do
4. 334-38 .. .. .. Broad leaf, yellow flower, white seed.
5. 369-70 .. .. .. Do do do

Arboreum Crosses.—Green seeded Arboreum cross.

Strains were distributed in the Chamarajanagar and T.-Narsipur areas. Owing to heavy rains, seeds were not sown in Chamarajanagar. In other places, they came up well in the beginning but were found to lack in vigour of growth. Local Nadam had a better growth. S. 69 and the new selections were very badly damaged by stem borers.

B. Exotic Cottons.—The following four varieties were sent to Technological Laboratory, Matunga, Bombay, for report. The report on the samples is given below:—

GRADER'S REPORT.

—	M. A. IV. 204–208	M. A. IV. 25–25	M. A. II	M. A. IV Babbur
Contract valued under ..	Broach	Broach	Broach	Broach
Class	Extra Superfine	Extra Superfine	Superfine	Superfine
Colour	White	White	White	White
Staple Length	31—32"	7—8" to 31—32"	¾" to ⅞"	¾ to ⅞"
Staple Strength	Fair	Poor	Poor	Poor
Regularity	Fair	Poor	Poor	Poor
Value above or below contract rate.	Rs. 4 on	Rs. 5 on	Pass	Pass
Basis	Rs. 3	Rs. 193	Rs. 193	Rs. 193
Date of valuation	10–12–32	10–12–32	10–12–32	10–12–32
Remarks	....	....	....	....

FIBRE PATICULARS.

——	M. A. IV 202–208	M. A. IV 25–25	M. A. II	M. A. IV Babbur
Fibre Length (inch)	....	....	....	....
(a) By bolls sorter	1·02	0·82	0·85	0·88
(a) By bear sorter	0·99	0·84	0·84	0·90
Fibre wt. per inch	0·138	0·145	0·186	0·134
(Millionth of an inch) ..	....	....	....	....

SPINNING MASTER'S REPORT.

M. A. IV 204-208.—The cotton is creamy white, bright, clean, has a good feel, well ginned, looks like charka ginned lint, the card sliver is clean, web even and nep free and 10 flat strips weigh 13·5 grammes.

M. A. IV. 25-25.—The cotton is creamy white, clean, has a good feel, ginning, similar to preceeding cotton. The card sliver is clean, web good and 10 flat strips weigh 15·0 grammes.

M. A. II.—The cotton is creamy white in colour, clean, has a good feel, well ginned. The card web is even and nep-free. Sliver clean and Ten flat strips weigh 14·3 grammes.

M. A. IV. Babbur.—The cotton is creamy white in colour, clean, has a good feel, well ginned. The card sliver is clean and web good.

Yarns.—The 30'S yarn spun from M. A. IV 204-208 are 'even.' Those spun from M. A. II and M. A. IV. Babbur are "even to fairly even." While those spun from M. A. IV 25-25 are fairly even.

The yarns obtained from M. A. IV. 25-25 and M.A. IV Babbur are slightly neppy, while those given by the other strains are practically free of neps.

From their yarn strength results these cottons are adjusted suitable for the following highest standard warp counts :—

Cottons	Highest standard warp counts
1. M. A. IV. 204-208	41's
2. M. A. IV 25-25	31's
3. M. A. II	31's
4. M. A. IV Babbur	32's

M. A. IV. 204-208 which has the longest staple among those of the Mysore American Cotton has given by far the best spinning performance. In this respect, M. A. IV. Babbur is rather disappointing although it possesses a longer and finer staple than the other two Mysore American strains. On comparing the results, we find an improvement in all Mysore American Cottons which is very notable in the case of the M. A. IV. 204-208.

This year, the early Mungar rains have been taken advantage of and the following selections have been distributed to several places for preliminary trials :—

1. M. A. IV, 204-208
2. M. A. II
3. M. A. IV, Babbur
4. M. A. I, Black seed

C. Singapur Kaval.—About 3 acres were cleaned and the land was brought under cultivation. Most of the Doddahatti work material was transferred to this place and sown under rainfed condition. Fifty different strains were sown and eight varieties were tested in the plots for yields. The same varieties have given high yields under irrigation at Babbur. Since the work on Doddahatti is mainly meant for the rainfed area further work will be continued at Singapur. The following gives the relative yields of the same variety in the two places :—

No.	Variety	Singapur Kaval Rainfed crop		Babbur Farm Irrigated crop	
		Seed cotton in lbs. per acre	Per cent Lint	Seed cotton in lbs. per acre	Per cent Lint
1	Gadag No. 1 ..	162	30·20	483	32·80
2	D. A. No. 2 ..	212	32·20	....	....
3	M. A. IV, Babbur ..	126	31·70	509	32·60
4	M. A. IV 25-25 ..	159	31·70	476	31·50
5	M. A. IV 76-80 ..	99	31·25	375	34·67
6	M. A. IV 95-98 ..	121	32·80	465	34·25
7	M. A. IV 204-208 ..	142	32·90	485	33·70
8	M. A. II	207	28·10	646	30·18

It was also noted that under irrigation the growth of lint is greater and gave a higher percentage of lint. This effect was noted in almost all strains tested.

A collection of different strains of Doddabathi was made and tested. It was found to vary very much. Collections made near Arsikere were the best and Davangere, Doddahathi was found to be poorest in vigour. An attempt will be made to make a large number of plant selections in the fields in the next season. As the work on this cotton is developed here, the work at Babbur will be gradually curtailed.

II. Jola.

In the line culture, 81 varieties were studied as in previous years. Selection of good earheads in each variety have been made.

All the promising varieties were sown in the comparative plots to test the yield. The results are given below :—

Comparative Test Plot Yields for Jola, 1932-33.—

No.	Variety	Yield per acre		Remarks
		Grain in seers.	Straw in lbs.	
1	Chitaldrug Jola	225·9	1921	
2	Bile Dodda Jola	219·2	1859	
3	White Jowar Rabi variety	199·5	1652	
4	Maldandi	128·1	1114·03	
5	Sorghum No. 2	188·5	1438·6	
6	Bile Jola Acc. 34	295·6	1912·2	
7	Dhagadi	202·8	1903	
8	Basavanapadada Jola	130·9	1377	
9	Ibbani	245·6	1456	
10	Shabad	119·4	1535	
11	Andapallaga	219·2	1912	
12	Parsi	190·7	1535	
13	Dhudia	180·9	1763	
14	Bile Jola Gannayakanahalli	207·2	2052·6	
15	Lamshahi	197·4	1802·6	
16	Mysore Bile Jola	223·7	1907·8	

Cocoanuts.—Detailed study of the nuts of all the 355 plants was undertaken regarding the shape, the size and colour of the nut. The preliminary study has revealed that there is a good deal of variation. All the plants have been classified as under :—

1.	Trees having big and very big nuts	58
2.	Trees having small and very small nuts	123
3.	Seedlings and trees not bearing	19
4.	Trees having tender and small size nuts (difficult to study their colour, shape and size now.)	26
5.	Trees having medium size nuts and very few mixed nuts Small and big.	129

The Java seedlings are making satisfactory growth.

Groundnuts.—Bulk plots were grown on the Farm.

Sugar-cane.—H. M. 602 and H. M. 553 are still about the best on the farm. H. M. 544 striped (Babbur Striped) does very well on deep rich soils. The new seedlings H. M. 607 and H. M. 606 are promising. P. O. J. 2878 and E. K. 28 have flowered freely early in the season as in other places.

General.—The Botanical section on this farm was made a separate unit since November 1932 as per G. O. No. A. 983-4—A. & E. 31-32 on 1st September 1932 and placed in charge of the Junior Assistant Botanist.

B. VENKOBA RAO,
Junior Assistant Botanist.

V. K. BADAMI,
Economic Botanist.

REPORT OF WORK DONE ON THE PADDY BREEDING STATION, NAGENAHALLI, MYSORE, FOR THE YEAR 1932-33.

PART IV.

Charge.—Mr. S. V. Sharma was in charge of the Station during the year.

Seasonal Conditions.—The total rain-fall during the period From 1st April to the end of the year was 29·81 inches against 24·24 inches of last year and 6·18 inches more than the average for ten previous years. It was distributed over 69 days as against 55 days in the previous year. The summer was very hot. Excessive rains in October and November during the flowering period greatly affected the fertilization resulting in much chaff in many varieties. The distribution was as follows :—

Statement of rain-fall from 1st April to 31st December.

Month	Amount of rain-fall in inches	No. of rainy days	Details of rainy days			
			Less than ½″	½″ to 1″	1″ to 2″	More than 2″
April 1932	1·47	3	2	..	1	..
May ,, ...	6·76	11	7	2	1	1
June ,, ...	0·68	4	4	..	..	..
July ,, ...	1·72	12	12	..	..	..
August 1932	6·10	10	6	1	2	1
September 1932	0·57	4	4	..	..	..
October 1932	7·89	16	10	4	1	1
November 1932	4·35	9	5	2	2	..
December 1932	..	..	..	..	..	..
Total ..	29·81	69	50	9	7	3

Green Manures.—Owing to belated rains in April and low rain-falls in June and July the green manure crops were a failure. There was a heavy attack of Sunnhemp caterpillars. On the dry lands the growth of sunnhemp was good. The crop was used for manuring the nursery plots. The green manure experiments were a failure.

Selection Work.—During the year, 48 selections were tested in the plots. In every case there were three plots for each selection and G. E. B. 24 was used as the check for comparison.

1. *Group.*—In this group, selections from Nagpur Sanna, Kaddi and Alur Sanna varieties were tested.

Variety	Grain per acre in lbs.	± St. Dev.	Straw per acre in lbs.
G.E.B. 24 (Check)	2,471	779	3,601
S. 12 Nagpur 6	2,230	377	3,473
S. 236 do 36	1,963	48	3,071
S. 246 do 46	1,946	390	2,811
S. 242 do 42	1,878	291	2,718
S. 197 Alur Sanna 39	1,964	417	3,317
S. 203 do 45	1,857	374	3,051
S. 179 do 21	1,842	513	3,354
S. 199 do 41	1,706	146	3,158
S. 169 Kaddi 62	2,310	210	4,369
S. 149 do 72	2,261	150	4,470
S. 434 do 116	2,179	401	4,156
S. 433 do 115	2,063	347	3,371

For details, *vide* Table I.

2. *Group.*—In the second group, selections from P. S. 49, Banku, Ganasale, Garikesanna, Halubbalu, Sakalathi and Sannabhatha were tested with G. E. B. 24 as check:—

Variety	Grain per acre in lbs.	±St. Dev.	Straw per acre in lbs.
G.E.B. 24 (Check)	2,517	372	4,550
S. 367 Sannabhatha 1	2,122	35	5,328
S. 374 do 8	2,180	310	4,357
S. 268 Ganasale 8	2,102	243	3,654
S. 269 do 9	2,024	394	3,757
S. 328 Banku 11	1,768	205	3,387
S. 335 do 18	1,767	158	3,660
S. 290 Sakalathi 12	1,629	396	6,034
S. 292 do 14	1,530	209	5,142
S. 298 Halubbalu 6	1,487	162	2,490
S. 317 Do 25	1,414	104	2,418
S. 390 Garikesanna 10	1,226	185	4,024
S. 386 do 6	1,160	107	3,494
S. 284 P.S. 49-2	1,013	185	2,426

3. *Group.*—In the third group, one Kembuthi selection and eight Pattasamanahalli selections were tested with G. E. B. 24 as check:—

Variety	Grain per acre in lbs.	±St. Dev.	Straw per acre in lbs.
G.E.B. 24 (Check)	2,457	209	3,643
S. 67 Kembuthi 5	2,735	405	6,154
S. 476 Pattasamanahalli 51	2,457	304	5,345
S. 477 do 52	2,347	124	5,555
S. 363 do 34	2,206	147	5,562
S. 511 do 86	2,179	136	5,615
S. 502 do 77	2,074	163	4,743
S. 364 do 35	2,001	79	5,032
S. 506 do 81	1,889	135	4,581
S. 507 do 82	1,858	595	4,337

4. *Group.*—In the last group two early varieties were tested. There were five selections in Chintamani Sanna and five in Hebbal three months variety with G. E. B. 24 as check:—

Variety	Grain per acre in lbs.	±St. Dev.	Straw per acre in lbs.
G.E.B. 24 (Check)	2,292	402	4,335
S. 547 Chintamani sanna 30	1,926	128	4,257
S. 536 do 19	1,608	91	5,355
S. 532 do 15	1,433	107	5,233
S. 537 do 20	1,375	191	4,825
S. 531 do 14	1,363	131	4,625
S. 396 Hebbal three months 2 ..	2,256	197	5,180
S. 406 do 12 ..	1,804	187	3,265
S. 399 do .. 5 ..	1,740	545	3,623
S. 397 do 3 ..	1,548	350	2,747

Out of all the selections, S. 67, a selection from Kembuthi has given the highest yield. It has a medium brown grain with white rice. In three years out of four years' tests it has given higher yields than G. E. B. 24 in plot tests. It is a free tiller, hardy, gives good straw about 6,154 lbs. against 3,643 lbs. in G. E. B. 24 but lodges much. Among the Nagpur sanna Selections—S. 246 S. 12. S. 236 and S. 242 are very promising. S. 246 is a fine grain with a good colour and it ripens earlier than G. E. B. 24 by about a week. S. 139, a selection from Kaddi, is getting popular in the locality and has given

a higher yield than G. E. B. 24 for three years. S. 476, a selection from Pattasamana halli, is very promising. It gives a good yield of straw and grain and is well suited for poor gravelly soils.

A large number of new plant selections have been made in G. E. B. 24, Pattasamanahalli, Maharajabhogam and Nagpur Sanna during the year.

Varietal Tests.—There are now over 200 varieties under observation. All those which were found to be low yielders and those which were recently introduced were sown in small plots. In all, 57 varieties were tested in triplicate plots.

I. Very early varieties six, ripening in 80 to 90 days after transplantation:—

Variety	Yield of grain per acre in lbs.	±St. Dev.	Straw per acre in lbs.
Coarse.—			
1. Hebbal two months	1,902	100	3,695
2. T. 2040	1,350	441	2,522
3. Aduthorai 4	1,725	231	3,269
4. do 3	1,680	131	3,632
5. Giddabyra	1,320	386	3,275
Fine.—			
6. Bangara Kaddi	1,589	78	4,006

II. Early varieties 17, ripening in 100 to 110 days after transplantation:—

Coarse	Yield of grain per acre in lbs.	±St. Dev.	Straw per acre in lbs.
Coarse.—			
1. Hassan Doddi	1,769	374	2,593
2. Bidnur sanna	1,309	273	2,224
3. Gabah Tongson (Java)	1,988	420	2,859
4. Kavadedoddy	1,368	215	2,246
5. Chandragutty	1,518	391	2,493
6. Paddy No. 3.	1,592	519	2,706
7. Halubbalu	1,675	467	3,469
8. Kanagadale	1,001	269	1,334
Fine.—			
1. Small grained	1,486	447	2,492
2. Chintamani Sanna	1,004	160	2,101
3. P.S. 49	1,234	267	2,333
4. Basumathi	1,550	276	2,246
5. Kempuraja	1,129	177	2,253
6. Bangarthiga	1,110	222	2,783
7. P.S. 50	1,035	628	1,720
8. New Sanna	1,418	142	2,424
9. Vizayanagaram Paddy	1,485	279	2,933

III. Medium varieties 11, ripening in 110 to 120 days after transplantation:—

Variety	Yield of grain per acre in lbs.	± St. Dev.	Straw per acre in lbs.
Coarse.—			
1. T. 2038	1,631	85	2,296
2. Gabah Scrivimankoti (Java) ..	2,634	301	3,641
3. Hasadi	966	226	2,601
4. Madhure Paddy	1,259	118	2,663
Fine.—			
1. Natanahalli sanna	1,427	301	3,545
2. Alur Sanna	1,282	167	2,994
3. Garike Sanna	1,260	304	4,067
4. Banku	1,215	107	2,546
5. Pichodi	1,215	379	2,570
6. Kolamba 42	1,158	128	2,946
7. Black Scented	723	100	2,455

IV. Late varieties 15, ripening in 120 to 130 days after transplantation:—

Variety	Yield of grain per acre in lbs.	± St. Dev.	Straw per acre in lbs.
Coarse.—			
1. Chamba	1,420	108	3,496
2. Chamba Sanna	1,431	278	3,010
3. Duri Sanna	1,447	116	2,853
4. Gabah Tijima (Java)	1,862	128	5,330
5. Bilebhatta	1,841	362	5,258
6. Gabah Temas (Java)	1,684	264	3,839
7. Gabah Sirasaki (Java)	1,260	197	3,704
8. Doddabyra	1,023	379	2,260
Fine.—			
1. Maharajabhogam	1,662	337	3,252
2. G.E.B. 24	1,582	432	3,160
3. Bylunda	1,959	141	3,445
4. Delhipraya	1,620	223	2,517
5. Balaramabhogam	1,429	234	3,422
6. Kichadi Sanna	1,447	476	2,587
7. Ratnachoodi	2,084	425	3,573

V. Very late varieties seven, ripening after 130 days after transplantation:—

Variety	Yield in grain per acre in lbs.	± St. Dev.	Straw per acre in lbs.
Coarse.—			
1. G.E.B. 24	1,582	432	3,160
Medium Variety.—			
1. Kembuthy	2,132	554	3,915
2. Pattasamanahally	1,445	255	3,911
3. Kaddy	1,811	184	3,587
4. Rangoon Red	1,231	337	3,295
5. Rangoon White	1,340	110	3,131
Fine.—			
1. Nagpur Sanna	1,711	340	2,807

In these tests, late varieties, Maharajabhogam, Bylunda, Delhiprayag, Ratnachoodi, Kembuthi, Kaddy and Nagpur Sanna, have given better results than G. E. B. 24. Among the coarse types, four Java varieties and Bili Bhatta have given better yields than the check G. E. B. 24.

Spacing Experiments.—A spacing of 6" to 9" seems to be the optimum distance between plant to plant for G. E. B. 24 on soils like those of the Breeding Station. As the results obtained in previous years were conclusive, the experiment was discontinued this year.

Manurial Experiments.—The manurial experiments were continued under the supervision of the Agricultural Chemist. Owing to the low prices for paddy, it does not pay to use artificial manures for paddy in most cases.

(1) *Different Doses of Manures.*—The general dose of one ton of Farm yard manure is given. The standard mixture contains—

N—30 lbs. per acre dose.
P_2O_5—45 lbs. ,,
K_2O—20 lbs. ,,

Treatment	Average yield of grain per acre in lbs.	±St .Dev.	Weight of straw per acre in lbs.	Loss
				Rs. a. p.
1. Check. One ton Farm-yard manure ..	2,859	705	5,084	....
2. Single standard dose 30 lbs. N, 45 lbs. P^2O^5, 20 lbs. K^2O.	2,873	421	5,479	—24 8 7
3. One and a half standard dose. 45 lbs. N, 67½ lbs. P^2O^5, 30 lbs. K^2O.	2,808	416	5,549	—39 6 5
4. Double Standard dose. 60 lbs. N, 90 lbs. P^2O^5, 40 lbs. K^2O.	2,986	298	6,288	—44 12 2
5. Two and a half standard dose. 75 lbs. N, 112 lbs. P^2O^5, 50 lbs. K^2O.	3,245	411	6,833	—48 8 0

Heavy doses of manure seems to be wasteful. There is a slight increase in yield with larger doses but it does not pay.

(2) *General Manurial Requirements.*—All the plots received a general manuring of farm yard manure at the rate of one ton per acre. Doses of other manures were,—

N—30 lbs. P2O5—45 lbs. K_2O—20 lbs.

Treatment	Average yield of grain per acre in lbs.	±St. Dev.	Weight of straw per acre in lbs.	Loss or gain
				Rs. a. p.
1. Cheeck. One ton Farm-yard manure ..	2,265	301	4,815	....
2. Nitrogen	2,699	291	5,802	+ 4 7 11
3. Nitrogen plus Phosphoric acid	2,699	172	5,827	— 7 5 4
4. Nitrogen plus Potash	2,704	239	5,949	+ 2 5 8
5. Nitrogen plus Phosphoric acid plus Potash	3,005	378	6,962	+ 2 13 5

For these gravelly soils, an application of nitrogenous manure seems to pay. There is very little effect of P_2O_5. An application of K_2O seems to have slight benefit. Complete manure is beneficial. For further details, *vide* Agricultural Chemist's Report.

(3) *Nitrogen in Various Forms.*—All the plots received a general dose of one ton farm yard manure and 45 lbs. of P_2O_5 as super. 30 lbs. of Nitrogen was given in various forms:—

Treatment	Average yield of grain per acre in lbs.	±St. Dev.	Weight of straw per acre in lbs.	Loss or gain
				Rs. a. p.
1. Check one ton of Farm-yard manure ..	2,227	286	3,832	....
2. N as Calcium Cynamide	2,695	170	4,772	— 7 12 0
3. N as Ammonium Sulphate	3,061	120	5,756	+ 9 8 0
4. N as Sodium Nitrate	2,471	214	4,356	—17 0 0
5. N as Groundut Cake	2,530	437	5,136	—12 2 9

For further details, *vide* Agricultural Chemist's Report.

Ammonium Sulphate seems to be the best form of nitrogenous manure for the type of soil on the station.

(4) *Phosphoric Acid in different forms.*—The plots received a general dose of one ton of farm yard manure and 30 lbs. of N as Ammonium Sulphate, 45 lbs. of P_2O_5 was given in two different forms:—

Treatment	Average yield of grain per acre in lbs.	±St. Dev.	Weight of straw per acre in lbs.	Loss or gain
				Rs. a. p.
1. Check one ton of Farm-yard manure ..	1,808	197	4,153	....
2. P^2O^5 as Super Phosphate	2,509	317	5,802	+ 2 10 8
3. P^2O^5 as Steamed bonemeal	2,528	302	5,586	+ 2 14 0

For further details, *vide* Agricultural Chemist's Report.

There does not seem to be any appreceable difference between the effect of the two manures.

(5) *Varying doses of P_2O_5 in the form of Super.*—General dose of one ton of farm-yard manure was given and in addition 30 lbs. N was applied half in the form of Ammonium sulphate and the rest as groundnut cake:—

Treatment	Average yield of grain per acre in lbs.	±St. Dev.	Weight of straw per acre in lbs.	Loss or gain
				Rs. a. p.
1. Check one ton of Farm-yard manure ..	2,338	573	4,180	....
2. Fortyfive lbs. P_2O_5	2,706	222	5,728	— 4 12 4
3. Sixty lbs. P_2O_5	2,749	88	5,659	—10 5 9
4. Ninty lbs. P_2O_5	2,894	226	5,918	—13 2 7

For further details *vide* Agricultural Chemist's Report.

It does not pay to give large doses of P_2O_5 to these soils, under present price conditions.

Seed Distribution.—The demand for G. E. B. 24 seed was very great. To meet a demand like that of last year at least 50 acres are necessary. Arrangements will be made on the Irwin Canal to grow seed of improved strains and promising varieties for seed distribution. The area of the Station is insufficient for seed production. To fecilitate easy distribution and cut down cost of production "A" farms will be organised in the different paddy areas of the State when the Seed Distribution Section is revived.

In the bulk plots S. 246 (Nagapur Sanna Selection) yielded nearly as much as G.E.B. 24 and being a finer sort of rice it feeches a higher price in the market. There was a big demand for S. 246, S. 236, S. 12, S. 139, S. 138 and S. 49. Though the market price of paddy was between Rs. 6-0-0 to Rs. 8-4-0 per candy cultivators bought paddy on the station at Rs. 10 per candy for seed purposes. The price is kept at a higher level to prevent people from buying for consumption.

A very large quantity of G. E. B. 24 was given out for seed purposes. Some of the promising selections also have been issued. The distribution has been either through the Agricultural Inspectors or through direct sales on the station:—

	Through the Agricultural Inspectors	Direct Sale	Total Sales
	Seers	Seers	Seers
1. G.E.B. 24	16,275	26,798	43,073
2. S. 246	660	3,336	3,996
3. Chintamani Sanna	307	255	562
4. S. 138	91	1,240	1,331
5. S. 364	115	164	279
6. S. 12	120	2,409	2,529
7. Hebbal Three months	168	....	168
8. Kolamba	160	90	250
9. Banku	200	114	314
10. P.S. 49	85	209	294
11. S. 11	....	800	800
12. S. 139	....	1,822	1,822
13. S. 236	....	1,292	1,292
14. Other strains	260	2,997	3,257
Total ..	18,481	41,526	60,007

General.—The new well was completed and fitted with the motor and pump removed from the bank of the canal. Two small threshing floors have been prepared. Preliminary experiments regarding the value of various green leaves used in the locality have been laid out in pits in the Latin Square method. Study on the cooking quality of rices has been continued. A large number of crosses have been made to evolve better varieties of paddy. The health of the station was fair. The effect of the work done by the Malaria station has been very beneficial.

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Junior Assistant Botanist.

V. K. BADAMI,
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REPORT OF WORK DONE ON THE KAR RAGI BREEDING STATION, HUNSUR FOR THE YEAR 1932-33.

PART V.

Charge.—Mr. T. Srinivasa Murthy, M.Sc., continued to be in charge of the Breeding Station. He was on tour for 39 days days during the year.

Seasonal Conditions.—A total rain-fall of 43·26 inches distributed over 80 days has been received during the cropping season. The Mungar rains which began on the 13th April 1932 being very light could not be utilized and the sowings of ragi were commenced on the 5th of May 1932. The monsoon was very disappointing for Kar Ragi and in most places round about Hunsur, Kar Ragi was a complete failure. There was a rain-fall of 13·23 inches in 13 days followed by a draught throughout June 1932. The Hingar rains during October 1932 interfered very much in the harvesting, stacking and threshing operations.

Rain-fall Statement.

Month	Rain-fall		Rain-fall below ¼″		Rain-fall below ½″		Rain-fall below 1″		Rain-fall below 2″		Rain-fall above 2″	
	No. of days	In. C.	No. of days	In. C.	No. of days	In. C.	No. of days	In. C.	No. of days	In. C.	No. of days	In. C.
April	9	4 53	5	0 83	2	0 79	1	0 96	1	1 95	..	..
May	13	13 23	2	0 22	3	0 79	3	1 93	4	6 45	1	3 84
June	7	0 83	6	0 52	1	0 31	..	..	..	..	..	..
July	15	4 60	7	0 91	7	2 80	..	..	1	90	1	..
August	16	7 16	4	0 25	5	1 93	6	3 96	1	1 32	..	..
September ..	6	0 75	6	0 75	..	..	..	..	..	..	..	..
October	23	9 52	11	1 45	6	2 0	3	1 99	3	5 25	..	..
November ..	8	2 64	3	30	3	1 07	2	1 27	..	..	..	..
Total ..	97	43·26	44	5·23	27	9·49	15	10·11	10	16·87	1	3·84

Ragi.—All the varieties were maintained during the year and some fresh selections were made. Since the station has been fully laid out now, attempts have been made to start suitable rotations for the various plots. Soils vary from poor gravelly soils to rich heavy black clay.

All the varieties of Kar and Hain Ragies have been maintained. If the later rains fail the Hain Ragies do not ripen otherwise they give heavy-yields of grain and straw in this raea. Two varieties M. M. 1 and M. M. 2 from the Marthur Farm made only a vegetative growth and did not flower at all during the season.

All the plant selections made in 1923 have been continued. Some of them are promising and they are now being critically tested. During the year 1923, new plant selections have been made in fields round about Hunsur.

Plot Trials.—During the year, 16 selections have been tested H.K. 21, H.K. 25, Bochanahalli 82, Cox-comb, H.K. 18 and H.K. 13 have done very well during the last three or four years.

The following table gives the yields of grain in percentages. The yield of local ragi is taken as check 100% and this represents an acre yield of 565 seers per acre.:—

TABLE II.

Each plot two guntas. Repeated three times.

Selection		Yield of grain in percent. 1931-32	1932-33.
Check	Mixture G. op and G.C. V. op. and V.C.	100·0	100·0=565 seers.
H.K. 21	G. op.	125·4	208·3
H.K. 25	G. op.	155·7	198·5
Bochanahalli 82	V. op.	167·8	182·9
Cox-comb.	V. C. branching	156·6	168·9
H.K. 18	G. op. ..	167·9	156·6
H.K. 13	V. C.	87·0	136·1
H.K. 8	G. op.	83·5	124·4
C. 271	V. op.	124·4	113·4
C. 359	V. C.	130·3	108·2
H.K. 20	V. C.	116·2	96·6
C. 358	V. C.	106·8	95·2
C. 362	G. op.	125·3	85·8
C. 357	G. op.	117·5	85·0
C. 563	G. op	101·7	73·2
Jenumudda ..	G. C.	..	75·9
Hain Ragi			
H. 22	V. op.	125·3	85·8

TABLE III.

A group of ten selections were tested in " Four Rows Tests " and the results are given below.—

Selection	Yield of grain in percent 1930-31	1932-33
Check	100·0	100·0=380 seers.
H.K. 125	185·7	189·0
H.K. 102	106·1	183·7
H.K. 3	138·2	180·0
H.K. 10	109·6	176·1
H.K. 122	400·0	174·5
H.K. 124	226·0	167·5
H.K. 19	108·8	164·7
H.K. 5	97·2	150·0
H.K. 6	108·8	145·8
Gavanahalli 99	99·9	139·2

TABLE IV.

A second group of eleven selections were tested in "Four Rows Tests". The results are given below.—

Selections	Yield of grain in percent 1931-32	1932-33
Check	100·0	100·0=767 seers.
K. 1	100·6	129·8
Muthiga 36	118·8	125·1
C. 126	..	123·4
K. 2	105·3	119·8
K. 61	96·7	115·2
H.K. 14	99·5	113·6
H.K. 22	99·4	112·2
H.K. 101	133·9	108·6
H.K. 121	164·8	101·1
H.K. 117	130·6	93·7
H.K. 23	119·6	88·0

Selections H.K. 21, H.K. 25, Bochanahalli 82, Cox-comb, H.K. 18 and H.K. 13 have done very well for the past three or four years of their trial and hence it has been arranged to be distributed to the ranges. Last year, there had been very great demand for our seed ragies and we have *not* been able to meet it. We have sold 25 pallas of ragi last year and 40 pallas during April and May 1933 for seed. Arrangements have also been made with the Assistant Director, Mysore Circle to open "A" farms in three or four places and seeds have been sown under our direct supervision. A total quantity of 5,751 seers have been distributed for trials.

Castor.—The work of castor is being conducted on the lines of previous years and some of the selections are doing well. One acre and three guntas were under these experiments.

Groundnuts.—Total area under the crop was 1·25 acres and the yield was 1,567 seers. Damage caused by pigs and rats was great. The relative yields are as follows :—

H.G. 1 ..	..	100 per cent.
Spanish	..	65 ,,
Valencia	..	57 ,,

Spanish and Valencia get heavy attacks of Tikka disease but they ripen very early.

Sesamum.—The area under this crop was one acre. The plant selections were continued. There were some which were found to be splitting into black and white seeded types. They are being selected further. The yield was 150 seers per acre.

Paddy.—One acre and 13 guntas of land in E. and F. ranges were transplanted with six varieties of Paddy and their results are given below. G.E.B. 24 has given the best yield :—

Selections.	Yield per acre in seers.
Local Kaddi	1,713
G.E.B. 24	2,112
S. 246	1,490
S. 139	1,610
S. 67	1,111

Kempu Raja Paddy got from the Paddy Breeding Station was sown in the newly formed E. Range and the crop had come up very well during the season but the seeds did not set in and all the ear-heads became empty as there were rains during the flowering period.

Bengal-gram.—Only 16 guntas were under this crop. The crop was a failure during the year.

Soy-beans.—Fifteen guntas were sown under this crop and 27 seers of seeds were obtained.

Avare and Coriander.—Avare was sown in lines between castors. The pods were badly attacked by pod-borers and only 18 seers were obtained in an area of one acre and four guntas. Coriander also was a failure during the year. In an area of two acres, only 34 seers were harvested.

Jola, Cow-pea and Sunflower.—Two acres were under fodder jola and 90 seers of seed were collected. Sunflower gave 28 lbs. of seed on 15 guntas of land. Cow-pea on ten guntas produced 36 seers of seed.

Chillies.—Nine guntas of land were transplanted with Marthur Farm chillies during the year under report and a quantity of 196 lbs. of dry chillies were obtained. People have appreciated this crop very much and there was heavy demand for this seed during the year.

Tobacco.—As Hunsur Taluk is a Tobacco growing centre for the Mysore State, a preliminary attempt at studying some of the local varieties and some varieties got from Babbur were attempted. A quantity of 296 lbs. of cured leaf was got out of an area of 19 guntas.

Horsegram.—Horsegram was sown on eight acres and ten guntas and 1,200 seers were harvested.

General Seed Distribution.—The following quantities of seeds were distributed in the year :—

Ragi	5,751	seers.
Paddy	1,465	,,
Groundnut	1,625	,,
Sesamum	282	,,
Fodder Jola	75	,,

General.—Plots have been fully laid out and all available area fit for cultivation has been sown with crops. The implement shed was put up and the Breeding Cage work is just over. Arrangements are being made to extend the present implement shed.

T. SREENIVASA MURTHY,
Junior Assistant Botanist.

V. K. BADAMI,
Economic Botanist.

REPORT OF THE MYSORE AGRICULTURAL SCHOOL, HEBBAL, FOR THE YEAR 1932-33.

PART VI.

Charge.—Mr. M. Narayan Reddi, B.Sc., (Edin.) was in charge of the School.

Strength.—The school commenced its sessions for the year on the 11th July 1932. There were 156 applicants for admission to the First year class which far exceeded the number in previous years. The Entrance examination was held on 17th July 1932. Sixty-two applicants were called for interview and 38 students were admitted into the First year class. The total strength of the school at the beginning of the year was 84 students, *e.g.*, 38 in the First year, 24 in the Second year and 22 in the Final year class.

During the year, there were 41 scholarships available to the students of which, 32 were Government scholarships and the rest District Board scholarships from Bangalore, Kolar, Shimoga, Chitaldrug and Kadur.

The final examinations were held during the last week of April 1933. This year all the examiners for the Diploma Examination were from outside and the school staff had no part in it. Messrs. D. Ananda Rao, Deputy Director of Agriculture, Madras and A. K. Yegnanarayana Iyer were the examiners for Agriculture; Messrs. Z. R. Kothawala, Imperial Dairy Expert and Lt. A. A. Monteiro for Animal Husbandry and Dairying, Messrs. V. Ganesha Iyer and M. G. Singrachar for Agricultural Engineering. Messrs. K. Krishna Iyengar and K. Ranganatha Rao for Veterinary and Dr. V. K. Badami for Economic Botany. Twenty-nine students including seven failed students appeared for the Diploma Examination and 21 students were declared eligible for the Diploma.

The Annual School Day and Distribution of Diplomas and Prizes which were not held during the last two previous years on account of financial stringency was celebrated successfully on the 3rd April 1933 at Hebbal under the presidency of *Diwan Bahadur Rajamantrapravina* K. Matthan, First Member of Council.

The sports section of the School was very active during the year. A new cricket oval was laid out at a cost of about Rs. 500. The Tennis court was relaid and a Hockey field has been provided for playing matches. The Literary Society, Debating Club and the Karnataka Sangha were working very satisfactorily during the year. Distinguished visitors addressed the students on various occasions. Leaders in the villages round about are taking a keen interest in the acitvities of the Karnataka Sangha meetings. Matches in cricket, hocky, foot-ball, etc., were played against the principal teams of Bangalore. Cricket teams from Shimoga and Tumkur visited Hebbal during December.

The pressure for admission into the school is increasing year after year and it has reached its limit this year. A good number of students who were desirous of undergoing training had to be turned away for want of proper facilities in the school. There are only 28 rooms in the Hostel and under ordinary circumstances, they can only accommodate 56 students. Since the present strength of the school is nearly 100, three to four students are housed in each room. This sort of overcrowding in the rooms is not desirable from every point of view. The question of providing additional accommodation both in the school and hostel has to be taken up very early.

Equipment.—The bore-well is now supplying the hostel with water. Extra room has been given for practical classes in Physics and Chemistry. The budget allotment for the school is based on the former strength of the school which varied between 20 to 40. There are now nearly 100 students in residence and the time has come now for a thorough reorganization of the school. The school was opened in 1913 and has worked successfully for twenty years. There is no separate budget allotment for the school. Except the Vice-Principal and his office staff, there is no separate teaching staff for the school. The staff is quite undermanned and requires immediate strengthening. With a separate budget, permanent staff for teaching, some more equipment, a school building and raising the standard of admission to E.C.P.S. students, the school can be immediately converted into a college as a first step towards its conversion into an Institute granting degrees of its own.

M. NARAYAN REDDI,
Vice-Principal.

V. K. BADAMI,
Economic Botanist and Principal.

REPORT OF WORK DONE ON THE HEBBAL FARM, FOR THE YEAR 1932-33.

PART VII.

Charge.—Mr. K. Krishna Murthy was transferred to the Kodihalli Farm on 3rd May 1933 and Mr. Arcot Devaraj, B.AG., was posted as Farm Manager in addition to his other duties as Officer of the Dairy and Sheep Farm.

Seasonal Conditions.—The total rain-fall during the year was 44·41 inches against 29·95 inches of the previous year and the highest amount received during the last ten years. In the last week of February about 3·98 inches of rain helped to get the lands cultivated early in the season. The first heavy shower fell on the 19th May. There were two periods of drought in June and July rains falling mainly in the first week in both the months. From August to the end of November there were heavy rains. There was no serious attack of pests or outbreak of disease on the farm during the year.

The distribution of rain-fall was as follows :—

Month.	Rain-fall in inches.	In No. of days.
January	0.00	..
February	3.98	2
March	0.00	..
April	0·48	2
May	2.52	8
June	3.66	8
July	3.00	10
August	9.77	15
September	3.27	8
October	10.77	14
November	6.58	10
December	0.42	2
Total ..	44.41 inches in	77 days.

1. Dry Lands.

Ragi and Groundnut Rotation.—The field did not receive any manure. Ragi, H. 40 was sown on 3rd of July and harvested on the 24th of November. Groundnut H.G. 1 was sown on the 3rd of July and harvested on the 9th of December. Both in straw and grain, plots of ragi grown after a crop of groundnut gave better yields than plots where ragi was grown year after year.

	Grain percentage 1932-33.	Grain percentage Average of eight years.
1. Ragi after Ragi	100	100
2. Ragi after Groundnut	165	221

2. *Green manuring the dry lands with Cow-pea and Sunnhemp.*—During the year sunnhemp has given the best results but the average yield of six years is in favour of cow-pea. H. 22 ragi was transplanted on the 7th of August and harvested on the 29th of November. (*Vide* Table II for results.)

	1932 Grain Percentage.	Average of six years
1. Farm yard manure	100.0—1,212 lbs. per acre.	100.0—800 lbs.
2. Sunnhemp	152.5	132.0
3. Cow-pea	113.8	141.4

3. *Ragi Manurial Experiments.*—The whole area received a general manuring of 10,000 lbs. of farm yard manure per acre. The field was sown with H. 22 ragi. Rotation is ragi after ragi as this is the general practice in this area. (*Vide* Table III.)

					Yield of grain in percent
1.	Check Farm yard manure only				100.0—1,150 lbs. per acre.
2.	Am. Sulph. 100 lbs.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. .. ..	140.0
3.	Am. Sulph. 100 lbs.	Pot. Chloride 40 lbs.	.. ..		100.1
4.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. ..		120.0
5.	Am. Sulph 100 lbs.	Super 200 lbs.	.. ..		118.3
6.	Soda Nitrate 140 lbs.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. .. ..	159.3
7.	G. Nut cake 260 lbs.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. .. ..	119.3
8.	Soda Nitrate 70 lbs.	G. Nut cake 130 lbs.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. 151.8
9.	Am. Sulph. 50 lbs.	G. Nut cake 130 lbs.	Super 200 lbs.	Pot. Chloride 40 lbs.	.. 124.5

(Further details *Vide* Agricultural Chemist's Report.)

Complete manures and higher doses of nitrogenous manures have given higher results. Phosphatic manures seem to be quite necessary.

4. *Ragi Varietal Tests.*—In one group six varieties were tested against Local Hullubele. All of them have given higher yields than the check H. 22 has given only 14·8 per cent more than the check. The others have yielded more. *Vide* Table IV.

	Grain Percent Yield.	Average of eight years.
Check Local Hullubele	100.0—1,850 lbs. per acre	100—1,190 lbs. per acre.
H.2	128.1	106.0
H.55	126.8	..
H.22	114.8	98.8
H.39	145.9	114.7
H.32	136.3	98.7
H.45	133.3	..

In the second group, three varieties were tested against the Local Hullubele. Here again the selections have given better yields than the check but the amount of straw produced is low.

	Grain Percent Yield.	Average of eight years.
Check Local Hullubele	100.0—1,212 lbs. per acre.	100.0–1,386 lbs. per acre.
H.71	150.1	109.9
H.73	137.4	106.9
H.77	140.2	117.9

(*Vide* Table V.)

B. Groundnut.—Bulk plots of six spreading varieties and one erect variety were grown and the yields were as follows. Ten thousand lbs. farm yard manure was applied to the field:—

Spreading varieties—

1.	Bassi	1,700 lbs. per acre.
2.	Mozambique	1,000 do
3.	Refeisque, Senegal	1,960 do
4.	Barbados	920 do
5.	Pondicherry	1,680 do
6.	Raipur	1,060 do

Erect variety—

7.	Valencia	760 do

Varietal Tests.—These series of tests were started this year. The varieties were sown in plots laid in Latin Squares. Only the average figures are given below :—

First Group.		Dry pods per acre.
Spreading Varieties—		
1.	Mauritius	1,388 lbs. per acre.
2.	Sogatoor	1,434 do
3.	Virginia	1,325 do
Erect Varieties—		
4.	Spanish	1,597 do
5.	Valencia	1,216 do
6.	H.G. I	1,170 do

Second Group.		Dry pods per acre.
Spreading Varieties—		
1.	Mauritius	1,216 lbs. per acre.
Erect Varieties—		
2.	African Red	1,125 do
3.	H.G.2	541 do
4.	Tennessee	1,252 do
5.	Spanish Improved	1,393 do
6.	Small Japan	1,343 do

Third Group.		Dry pods per acre.
Spreading Varieties—		
1.	Mauritius	1,590 lbs. per acre.
2.	Nigeria	1,372 do
3.	Carolina	1,470 do
4.	Big Japan	1,542 do
5.	Mysore Local	826 do
6.	Senegal	1,488 do
Erect Variety—		
7.	Valencia	1,234 do

Groundnut Manurial Experiments.—The experiment is laid out in two series (*a*) limed (*b*) unlimed. The whole plot received a general dressing of 5,000 lbs. of farm yard manure *vide* Table. The Plot was sown with H.G. No. 1 groundnut. Complete manures in the limed portion has given thve highest yield. (*Vide* Table VI.)

	Unlimed Series		Limed Series	
	Weight of dry pods per acre in%		Weight of dry pods per acre in%	
	1931-32	1932-33	1931-32	1932-33
Check	100.0—1,100	100.0=880	100.0=1,100	100.0=790
Am_2So_4 Super Kcl.	101.0	110.0	107.8	119.8
Super Kcl.	104.8	107.5	95.7	106.3
Super only	95.7	101.6	112.0	118.1

(For details *vide* Agricultural Chemist's Report.)

Wet Lands.

Paddy.

1. *Manurial Experiment.*—Different kinds of oil-cakes were tested in combination with Superphosphate or Bone-meal. The whole area in C. Range received a general dressing of Hongey leaf at 3,000 lbs. per acre and in D. Range except the check plot those treated with the manures did not receive any green leaf. (*Vide* Table VII.)

	C. Range		D. Range	
	Hongey leaf for all plots at the rate of 3,000 lbs. per acre		Except check plot no Hongey leaf for the other plots	
	Percent yield of grain		Percent yield of grain	
	1931-32	1932-33	1931-32	1932-33
1. Check	100.0=2,156 lbs. per acre.	100.0=1,480 lbs. per acre.	100.0=2,466 lbs. per acre.	100.0=1,513 lbs. per acre.
2. G. Nut oil cake 250 lbs. plus Super 150 lbs.	110.8	143.9	98.7	111.8
3. G. Nut oil cake 250 lbs. plus Bonemeal 100 lbs.	114.5	123.6	103.4	107.4
4. Hongey cake 500 lbs. plus Super 150 lbs.	115.7	127.7	110.0	108.6
5. Castor cake 500 lbs. plus Super 150 lbs.	115.5	121.6	115.6	102.6
6. Castor cake 500 lbs. plus Bone-meal 100 lbs.	115.2	122.9	106.6	111.2

(For details *vide* Agricultural Chemist's Report.)

2. *Artificial Manures.*—In addition to the artificial manures 2,500 lbs. of Farm Yard manure and 1,500 lbs. of green leaves per acre were ploughed in. (*Vide* Table VII A.)

	Artificials with organic manures		Artificials without organic manures	
	Percent yield of grain		Percent yield of grain	
	1931-32	1932-33	1931-32	1932-33
1. Check no organic or artificial manures.	100.0=1,092 lbs. per acre.	100.0=1,548 lbs. per acre.	100.0—1,642 lbs. per acre.	100.0—1,548 lbs. per acre.
2. Am^2So^4 (150 lbs.) plus Super (250 lbs.)	121.5	129.4	111.7	113.9
3. Am^2So^4 (150 lbs.) plus Super (335 lbs.)	135.7	184.1	136.4	115.2
4. Am^2So^4 (150 lbs.) plus Super (500 lbs.)	129.9	134.1	97.0	119.3
5. Organic Manures alone	125.3	108.3	125.3	108.3

Varietal Tests.—Varieties were tested both in the "Strip" and "Latin Square" methods. Ten thousand pounds of farm yard manure and 100 lbs. of Ammonium sulphate per acre were given to the plots in addition to 300 lbs. of Superphosphate. (*Vide* Table VIII.)

Varieties	Strip method		Chess Board method	
	Percent yield of grain		Percent yield of grain	
	1932-33	Average of 4 years	1932-33	Average of 4 years
1. Doddabele Check	100.0—1,500 lbs. per acre.	100.0—2,078 lbs. per acre.	100.0—1,800 lbs. per acre.	100.0—2,360 lbs. per acre.
2. Sannabhatha	128.8	115.6	121.9	104.2
3. Ganasale	132.3	122.2	120.2	108.5
4. Hassan Doddi	131.3	111.3	96.1	90.6
5. G. E. B. 24	127.0	107.5	103.8	109.5

Late transplantation seems to shorten the duration of the crop considerably.

Variety	1930	1931	1932
	Transplanted on 8th of July	Transplanted on 4th of June	Transplanted on 12th of August
	No. of days to ripen after sowing	No. of days to ripen after sowing	No. of days to ripen after sowing
1. Doddabele	182	186	179
2. Sannabhatha	203	201	182
3. Ganasale	203	203	183
4. Hassan Doddi	167	185	171
5. G. E. B. 24	212	217	199

For the Bangalore District Ganasale and Sannabhatha seem to be better suited than G.E.B. 24. They give better yield of grain and straw.

Sugar-cane Experiments.

1. *Varietal Tests.—Group I.*—Four seedling canes were tested against the local pattapatti. All of them are soft thick canes. H.M. 500 ripens before twelve months. H.M. 320 is ready for milling in twelve months and keeps well for a couple of months afterwards. H.M. 544 ripens in thirteen to fourteen months. H.M. 544 striped ripens a little later. H.M. 320 has again given the highest yield. (*Vide* Table IX.)

	Tons of cane per acre. 1932-33	Average of 8 years. Tons of cane per acre.
1. Local Pattapatti	17.6	21.14
2. H.M. 544	26.0	30.93
3. H.M. 544 striped	36.4	31.12
4. H.M. 500	36.9	30.88
5. H.M. 320	46.2	43.02

Group II.—Four medium hard canes were tested against H.M. 320. L.S. 0-0-$\frac{3}{8}$ was found to be a very poor cane this year also and it will be discarded next season. The new seedlings have not given better yields than H.M. 320. (*Vide* Table X.)

	Tons of cane per acre. 1931-32	1932-33
1. H.M. 320	49.7	41.5
2. H.M. 602	42.3	39.1
3. J. 33 a 0-0-1 (H.M. 603)	46.6	40.3
4. J. 33 a 0-0-4 (H.M. 604)	29.8	27.0
5. L.S. 0-0-$\frac{3}{8}$ (H.M. 605)	61.2	43.0

Manurial Experiments.—H. M. 320 was planted in the plots. During the year the highest yield of 45·4 tons was given by 100 lbs. of Niciphos II and 100 lbs. of super. (*Vide* Table XII.)

	Tons per acre.
1. Check	40.0
2. Am. Sulphate (200 lbs.) plus Super (336 lbs.)	42.0
3. Na. No3 (330 lbs.) plus Super (160 lbs.)	40.4
4. Am. Sulphate (240 lbs.) plus Super (336 lbs.)	39.2
5. Ammo Phos 20-20 grade (200 lbs.) plus Super (160 lbs.)	40.4
6. Niciphos (100 lbs.) plus Super (160 lbs.) plus Ammonium Sulphate (120 lbs.)	44.3
7. Niciphos II (100 lbs.) plus Super (100 lbs.)	45.4
8. Ammo Phos 13-48 (100 lbs.) plus Super (160 lbs.) plus Am. Sulphate (120 lbs.)	40.4

Retention or removal of tillerings after the first batch of canes have been formed in the clumps. Non-removal of the late tillers not only gave more canes, and higher yield of canes and good juice, but it also reduced the cost of production. (*Vide* Table XI.)

	No. of canes per acre.	Tons of cane per acre.
1. Late tillers retained	20,666	42.35
2. Do removed	19,656	39.93

Cattle.—The change in the feed adopted last year has been very beneficial and the bullocks are growing and keeping good condition. Four and a half pairs of trained animals were sent to the Kodihalli Sugar-cane Farm during the year on 27th February 1933. One bullock fractured its hind leg and got disabled. Seven pairs of Amritmahal bullocks were received from the Kodihalli Farm on 26th February 1933. They were broken for work and they have put on good condition now.

Seed Distribution.—During the year 2,05,868 setts of sugar-cane were distributed as follows :—

1. Mysore Circle	10,000	single setts.
2. Tumkur Circle	19,000	do
3. Shimoga Circle	4,500	do
4. Chikmagalur Circle	30,000	do
5. Mandya Circle	1,27,310	do
6. Union Members	2,000	do
7. Others	818	do
8. Outside the State	12,240	do

Distribution of paddy during 1932-33.

Three months' paddy	543 seers.
Hallubbalu	135 „
Budama	140 „
Hassan Doddi	182 „
Sannabhatha	105 „
Chendragutti	308 „
Garikesanna	4 „
Gunasale	670 „
Giddabyra	520 „
G.E.B. 24	1,020 „
Aluranna	553 „
Chintamani Sanna	3,309 „
Warrangala	125 „
Total ..	7,614 seers.

Distribution of Ragi during 1932-33.

H.22	2,014 seers.
H.45	140 „
H.2	842 „
H.71	20 „
Local Hullubele	249 „
H.77	60 „
K.1	118 „
H.45	50 „
H.55	50 „
Total ..	3,543 seers.

General.—Nearly 60 acres have been broken up for cultivation in the new area handed over to the farm. With the help of the village cultivators about 15 acres were sown with horsegram. It may take a couple of years more to bring the land into good cultivation fit for experimental purpose but at present it is giving much scope for the practical classes in the Agricultural School.

ARCOT DEVARAJ,
Farm Manager.

V. K. BADAMI,
Economic Botanist.

TABLE I.

Ragi Groundnut rotation Experiment.
Variety of ragi H. 40.
Sown on 3-7-1932.
Harvested on 24-11-1932.

Variety of Groundnut H.G. 1.
Sown on 3-7-1932.
Harvested on 9-12-1932 to 14-12-1932.

Range F. (17-22).

Treatment	1932-33				Average yield of eight years			
	Yield per acre in lbs.		Percent yields		Yield per acre in lbs.		Percent yields	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Ragi after Ragi ..	120	250	100.0	100.0	547.62	762.5	100.0	100.0
Ragi after Groundnut ..	198	300	165.0	120.0	1,211.60	1,455.24	221.2	190.0

TABLE II.

Ragi Green Manurial experiments.
Variety of Ragi H. 22.
Sown (Transplanted) 7-8-1932.

Green manure *verses* Farm yard manure.
Harvested on 29-11-1932.

Range E. (17-21).

	1932-33				Average yield of six years			
	Yield per acre in lbs.		Percent yields		Yield per acre in lbs.		Percent yields	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Farm Yard Manure ..	1,212	2,100	100.00	100.00	800.5	1,082.5	100.00	100.0
Sunnhemp	1,848	2,544	152.48	121.14	1,107.3	1,364.6	138.32	126.0
Cow-pea	1,380	1,800	113.86	85.71	1,132.2	1,449.6	141.44	133.9

TABLE III.

Ragi Fertilizer Experiments.
Sown on 13-7-1932.

Variety of Ragi H. 22.
Harvested on 22-11-1932.

Range A. (1-15).

Treatment	Yeld per acre in lbs.		Yield percent		
	Grain	Straw	Grain	Straw	
1. Check	1,150	2,066	100.00	100.00	
2. Am^2So^4, Super and Kcl.	1,621	2,772	140.17	134.17	Farm yard manure at 10,000 lbs. per acre.
3. Super and Kcl.	1,152	1,832	100.17	88.67	
4. Am^2So^4 and Kcl.	1,380	2,480	120.00	120.04	
5. Am^2So^4 and Super	1,360	2,280	118.35	110.30	Am2 So4 @100 lbs per acre.
6. $NaNo^3$, Super and Kcl.	1,832	2,572	159.30	124.49	Super @200 „ „
7. G Cake, Kcl. and Super	1,372	2,092	119.30	101.21	Kcl. @40 „ „
8. $\frac{NaNo3}{2}$ $\frac{G. Cake}{2}$ Super + Kcl. ..	1,746	2,280	151.82	110.35	NaNo3 @140 „ „
9. $\frac{Am^2So^4}{2}$ G. cake, Super and Kcl. ..	1,432	2,160	124.52	104.55	Groundnut Cake @360 „

N.B.—Rotation Ragi after Ragi as is the general practice in this area.

TABLE IV.

Ragi Varietal Tests.
Sown on 2-7-1932.

Rotation of groundnut and 5,000 lbs. of Farm yard manure per acre.
Harvested on 15-11-1932 to 19-11-1932.

Range H.

Variety	1932-33				Average yield of eight years			
	Yield per acre in lbs.		Per cent yield		Yield per acre in lbs.		Per cent yield	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Local Hullubele (Check) ..	1,050	2,015	100·00	100·00	1,190·8	1,578·4	100·00	100·00
H. 2	1,346	2,612	128·19	129·63	1,263	1,684·5	106·00	106·60
H. 55	1,332	2,252	126·86	111·76	..	..	..	..
H. 22	1,206	2,386	114·85	118·41	1,177	1,649·0	98·80	104·40
H. 39	1,532	2,252	145·90	111·76	1,366·6	1,630·7	114·70	103·30
H. 32	1,432	2,560	136·38	127·05	1,176·5	1,791·7	98·79	113·50
H. 45	1,400	2,640	133·33	131·02	..	..	..	..

The varieties H. 13 and H. 40 sown in previous years have been omitted this year and were replaced by the varieties H. 45 and H. 55.

TABLE V.

Castor and Avare rotation.
Range J. (16–30). This year ragi varieties.
Sown on 2-7-1932.
Harvested 15-11-1932.

Last year crop Castor and Avare.
Farm yard manure at 5,000 lbs. per acre.

Variety	1932-33				Average yield of eight years			
	Yield per acre in lbs.		Per cent yield		Yield per acre in lbs.		Per cent yield	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw
Local Hullubele (Check) ..	1,212	3,216	100·00	100·00	1,386·74	2,062·65	100·0	100·0
H. 71	1,820	3,146	150·17	97·82	1,525·37	2,381·25	109·9	115·4
H. 73	1,666	2,932	137·46	91·17	1,473·37	2,356·99	106·9	114·2
H. 77	1,700	2,446	140·05	76·25	1,635·49	2,312·46	117·9	112·1

TABLE VI.

Range B. (1–15) 30.
Last year Ragi.

Groundnut Manurial Experiments.
Variety of Groundnut H. G. 1.

Sown on 23-7-1932.
Harvested on 4-1-1933.

Treatment.—Farm yard manure .. .. 5,000 lbs. per acre.
Lime .. .. 1,120 „ „
$Am_2 So_4$ .. .. 50 „ „
Super .. .. 320 „ „
Kcl. .. .. 360 „ „

Treatment	1932-33 (Dry pods)		Average yield of two years	
	Yield per acre in lbs.	Per cent yield	Yield per acre in lbs.	Per cent yield
(A) Plots 5 to 17.				
Limed Series.—				
Check	790	100·0	945·0	100·0
Am^2So^4, Super and Kcl.	946·6	119·8	1,066·3	112·8
Super and Kcl.	840	106·3	946·5	100·2
Only Super	933·3	118·1	1,083·15	114·6
Unlimed Series.—				
Check	800	100·0	950	100·0
Am^2So^4, Super and Kcl.	880	110·0	996·5	104·8
Super and Kcl.	860	107·5	956·5	100·7
Only Super	813·3	101·6	933·15	97·9

TABLE VII.

Paddy Manurial Experiments (Oil cake series). Transplanted on 20-7-1932.
Variety.—Alur Sanna. (Hain Crop). Harvested on 21-12-1932.

Treatment	Grain		Straw	
	Per cent*	Lbs. per acre	Per cent	Lbs. per acre
RANGE C.				
1. Check Honge leaf only	100·0	1,480	100·0	1,986
2. Honge leaf G. Nut cake 250 / Super 150	143·9	2,130	157·5	3,130
3. Do / Bonemeal 100	123·6	1,830	152 5	3,030
4. Hongey leaf Honge cake 500 / Super 150	127·7	1,890	152·5	3,030
5. Honge leaf Castor cake 500 / Super 100	121·6	1,800	153·0	3,040
6. Do / Bonemeal 100	122 9	1,820	152·5	3,030
Range. D.				
1. Check Honge leaf only	100·0	1,573	100·0	1,740
2. G. Nut cake (250) *plus* Super (150)	111·8	1,760	136·2	2,370
3. G. Nut cake (250) *plus* Bonemeal (100)	107·4	1,690	124·1	2,160
4. Honge cake (500) *plus* Super (150)	108·6	1,710	125·8	2,190
5. Castor cake (500) *plus* Super (150)	103·6	1,630	131·6	2,290
6. Castor cake (500) *plus* Bonemeal (100)	111·2	1,750	130·4	2,270

TABLE VII-A.

Artificial manures with or without organic manures—Range C.

Variety.—Alur Sanna. Transplanted on 3rd and 5-8-1932. Harvested on 22-12-1932.

Treatment	Grain		Straw	
	Per cent	Lbs. per acre	Per cent	Lbs. per acre
1. Check *no organic or artificial Manures*	100·0	1,584	100·0	2,340
2. Am^2So^4 (150) *plus* Super (250)	113·9	1,804	111·9	2,620
3. Am^2So^4 (150) *plus* Super (250) *plus* organic manure	129·4	2,050	118·8	2,780
4. Am^2So^4 (150) *plus* Super (335)	115·2	1,825	114·1	2,670
5. Do *plus* Super (335) *plus* organic manure	134·1	2,125	115·3	2,700
6. Do *plus* Super (500)	119·3	1,890	92·09	2,156
7. Do *plus* Super (500) *plus* organic manure	134·1	2,220	114·5	2,670
8. Organic Manure alone	108·3	1,716	104·6	2,448

Organic manure was in the form of farm yard manure at 2,500 lbs. per acre and Honge leaf at 1,500 lbs. per acre.

TABLE VIII.

Paddy Varietal Experiments.
Transplanted on 13–8–1932.
Seedlings 26 days old.

General dose.—Farm yard manure 10,000 lbs. per acre.
Am_2So_4 100 ,,
Super 300 ,,

Variety	1932-33				Average yield of four years				Days
	Yield per acre in lbs.		Per cent yield		Yiled per acre in lbs.		Per cent yield		
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	
	Three plots each strip method.								
Doddabele Check ..	1,500	2,170	100·00	100·00	2,078·25	2,369·5	100·0	100·0	153
Sannabhatha	1,930	2,500	128·66	115·2	2,042·75	3,025·0	115·6	127·6	156
Gunasale	1,985	2,270	132·33	104·6	2,539·75	2,850·5	122·2	120·2	157
Hassan Doddi	1,970	2,795	131·33	128·8	2,314·25	2,450·5	111·3	103·4	145
G. E. B. 24	1,905	2,515	127·00	111·2	2,234·50	2,595·5	107·5	109·5	173
	Twelve plots each—Chess Board Method.								
Doddablee Check ..	1,800	2,815	100·00	100·00	2,360·50	3,125·5	100·00	100·0	152
Sannabhatha	2,195	3,065	121·9	108·8	2,461·25	3,577·25	104·2	114·4	155
Gunasale	2,165	2,570	120·2	91·2	2,572·25	3,252·75	108·5	104·5	156
Hassan Doddi	1,730	2,660	96·1	94·4	2,126·00	2,174·00	90·6	69·5	144
G. E. B. 24	1,870	2,555	103·8	90·7	2,341·75	2,450·75	109·5	88·4	172

TABLE IX.

Sugarcane varietal tests.

Planted on 19–1–1932.
Harvested on 12–3–33 to 6–4–1933.

Variety	1932-33			Average yield for eight years in tons per acre	Per cent
	Cane yield per acre in tons	No. of canes per acre	Per cent		
A. Range.					
Local Pattapatti	17·6	11,370	100·0	21·14	100·0
H. M. 544	26·0	15,180	147·7	30·93	146·4
H. M. 500	36·9	20,906	209·6	30·88	145·9
H. M. 544 Striped	36·4	18,853	206·8	31·12	147·3
H. M. 320	46·2	22,266	262·5	43·02	203·7

TABLE X.

Sugarcane varietal tests.

Planted on 20–1–1932.
Harvested on 7–4–1933 to 15–5–1933.

Variety	1932-33			Average yield for two years in tons per acre	Per cent
	Cane yield per acre in tons	No. of canes per acre	Per cent		
B. Range.					
H. M. 320 (Check)	41·5	23,810	100·0	45·6	100·0
H. M. 602	39·1	37,026	94·2	40·7	89·2
J. 33. 0-0-1 (H. M. 603)	40·3	39,560	97·1	43·4	95·4
J. 33. 0-0-4 (H. M. 604)	27·0	32,800	65·0	28·4	62·2
L. S. 0-0-$\frac{3}{3}$ (H. M. 605)	43·0	52,053	103·6	52·1	114·2

TABLE XI.

Variety H.M. 320 sugarcane.
Planted on 6–2–1932.
Harvested on 24–1–33 to 12–3–33.

Side shoots removed and retained experiments.

Series	Side shoots retained			Series	Side shoots removed		
	Number of Rows	Number of canes of 4 rows	Weight of canes in lbs of 4 rows		Number of Rows	Number of canes of 4 rows	Weight of canes in lbs. of 4 rows
1	4	663	2,918	1	4	604	2,726
2	4	641	2,974	2	4	619	2,861
3	4	669	2,997	3	4	660	2,955
4	4	671	3,090	4	4	603	2,741
5	4	706	3,276	5	4	693	3,109
6	4	618	2,959	6	4	595	2,783
Total ..	24	3,968	18,214	Total ..	24	3,774	17,175
Per Acre ..	125	20,666	42·35 tons	Per Acre ..	125	19,656	39·93 tons

TABLE XII.

Sugarcane Manurial Experiments.
Variety H. M. 320.
Planted on 9–3–1932.
Harvested from 17–2–33 to 5–4–1933.

Treatment	Cane yield per acre in tons 1932-33	Per cent yield	Average number of canes per acre
1. Check	40·0	100·00	21,468·75
2. Am^2So^4 (200 lbs.) *plus* Super (336 lbs.)	42·9	107·25	22,925·00
3. $NaNo^3$ (300 lbs.) *plus* Super (160 lbs.)	40·4	101·00	21,850·00
4. Am^2So^4 (240 lbs.) *plus* Super (335 lbs.)	39·2	98·20	22,812·00
5. Ammophos (20-20 grade) 200 lbs. *plus* super 160 lbs.	40·4	101·00	22,072·50
6. Niciphos (100 lbs.) *plus* Super (160 lbs.) *plus* Am2So4 (120 lbs.).	44·3	110·70	23,237·50
7. Niciphos II (100 lbs.) *plus* Super (100 lbs.)	45·5	113·50	23,450·00
8. Ammophos 13-48 (100 lbs.) *plus* Super (160 lbs.) *plus* Am^2So^4 (120 lbs.).	40·0	100·00	21,425·00

N.B.—General manuring of sannhemp at 15,469 lbs. per acre and groundnut oil cake at one ton per acre in three doses, the first one-third at the time of planting, second one-third at three-and-a half months, and the third at the time of earthing up one month later.

REPORT OF WORK DONE ON THE BREEDING OF THICK CANES ON THE HEBBAL FARM AND IRWIN CANAL FARM, MANDYA, FOR THE YEAR 1932 33.

PART VIII.

Charge. Dr. L. S. Doraswami, B.sc. (Hons.,) M.sc. (Lond.,) PH.D. (Lond.,) was appointed as per Government Order No. D. 5268-69—A. & E. 90-32-36, dated 21st April 1933, as Senior Assistant Botanist and he was in charge from 1st February 1933.

Scheme.—The scheme for breeding thick canes in the Mysore State at a cost of Rs. 21,000 spread over a period of five years for which the Imperial Council of Agricultural Research sanctioned the necessary amount in their Order No. 148—Agri., dated New Delhi, 16th January 1933 was put into operation during the year. While the staff and the cost of the X-Ray apparatus is paid by the Imperial Research Council, all other items of expenditure are met by the Budget allotment made for the Botanical Section.

Work.—The work was done at Hebbal Farm, Bangalore, Irwin Canal Farm, Mandya and at the Central Laboratories.

Hebbal Farm.

1. *Exotic Canes.*—Detailed study of 44 varieties of canes was undertaken: *vide* Table I for results. The best yields were.—

	Per acre	
	Canes number	Canes Tonnage
Red Mauritius (Check)	23,887	31·8
P.O.J. 33 a.	29,508	30·8
P.O.J. 213	60,422	40·9
P.O.J. 2878	21,233	24·1
E.K. 28	27,116	22·8
Striped Tanna	16,862	30·52
Local Striped	14,363	11·3

2. *Indigenous Canes.*—Seventy-one varieties of canes were studied with regard to their tonnage, brix content and pith formation. *Vide* Tables II and III for results.

3. *Seedling Canes.*—The performance of some Coimbatore Seedlings and a few medium Hebbal Seedlings are given below for comparison :—

	Per acre.	
	Canes number	Canes Tonnage.
Coimbatore Selections.—		
Co. 204	66,792	19·8
Co. 210	20,328	19·2
Co. 203	10,164	2·1
Co. 201	66,792	23·9
Co. 202	37,268	12·1
Co. 206	35,816	10·8
Co. 313	8,274	14·0
Co. 301	22,326	11·0
Coimbatore Selections.—		
Co. 290	24,980	17·9
Co. 281	37,002	15·7
Co. 205	43,560	12·6
P.O.J. 2878	23,482	14·9
E.K. 28	13,427	12·8

	Per cent	
	Canes number	Canes Tonnage
Hebbal Seedlings.—		
H.M. 610	31,069	16.5
H.M. 611	22,326	20.7
H.M. 603	18,423	19.9
H.M. 606	13,271	20.6

New Introductions.—The following new canes were introduced :—

Exotic Canes.—	origin	
P.O.J. 2727	Java	
P.O.J. 2883	Java	
E.K. 2	Java	Received from Padegoan, Bombay.
P.O.J. 213 Striped	Java	
Sealy Seedlings	U.S.A.	
D. 1135 Striped.		

Indigenous Canes.—

Co. 351, Co. 352, Co. 353, Co. 355, Co. 356, Co. 357 } (*a*) Coimbatore seedling canes. Sugarcane and Cholam crosses.

Co. 400, Co. 401, Co. 402, Co. 403, Co. 408, Co. 411, Co. 416 } (*b*) Coimbatore thick seedling canes. Received from Coimbatore.

Varietal Tests.—The following varieties have been planted for varietal tests. Each variety consists of three rows and replicated three times. H.M. 320 is used as a check.

I. *Group.*—H.M. 320 (Check) P.O.J. 2878, E.K. 28, P.O.J. 100 and H.M. 606.

II. *Group.*—Consists of H.M. 320 (Check). H.M. 603, H.M. 602, H.M. 607 and H.M. 609.

The germination and tillering capacity of these canes and their monthly growth are under observation.

New Seedlings.—(*a*) A very large number of seedlings were raised from several canes, but only 22,250 seedlings survived for transplanting in March. The following gave the largest number of seedlings :—

P.O.J. 2878	3,450	seedlings.
P.O.J. 213	1,330	,,
Co. 281	960	,,
Co. 313	1,200	,,
Kassoer 8	920	,,
H.M. 605	9,940	,,

The seedlings have not stood transplantation well owing to the ravages of white ants. The seedlings of P.O.J. 213 P.O.J. 2878, Kassoer 19, Kassoer 8, H.M. 605, Co. 281, Co. 313 and Co. 205 show a high percentage of survival. The performance of these seedlings are under observation with a view to select promising ones. The growth of P.O. J. 2878 seedlings is remarkable in some cases and it is likely that it would be a good parent for further work.

(*b*) Out of the seedling raised in 1932, about 281 selections were made.

Nutrition Experiments.—During 1932-33 season, several nutritional experiments with one-eye bud setts of H.M. 320 were laid out in the Latin Square method of planting.

The result of the experiments though disappointing revealed that sugarcane is gregarious in its habit and does not seem to thrive as well in isolated conditions as it would in plots.

TABLE I.

Sugarcane varieties. Exotic canes. Planted on 7–1–1932.
Harvested on 17–4–1933.

Serial No.	Variety	Per acre		Brix reading	Remarks
		No. of canes	Wt. of canes in tons		
1	Red Mauritius	23,887·86	31·87	16·1	
2	Local Striped	..	..	23·2	Harvesting incomplete.
3	Batjan	9,047·86	13·24	22·1	
4	J. 33 a	29,508·57	30·87	20·8	
5	J. 33	21,233·68	9·00	14·0	
6	J. 213	60,422·31	40·97	18·9	
7	J. 139	40,593·80	23·55	19·2	
8	J. 247	35,597·64	28·99	17·5	
9	E. K. 28	21,233·68	24·11	21·0	
10	P.O.J. 2878	27,166·62	22·81	20·8	
11	P.O.J. 100	26,388·97	16·63	19·0	
12	Kassoer	41,062·19	21·46	15·8	
13	B. 6388	18,111·08	14·49	16·0	
14	B. 6346	20,453·03	23·90	21·47	
15	B. 1529	33,411·82	13·30	15·4	
16	B. 6308	19,360·12	23·28	16·8	
17	B. 6450	9,047·86	15·33	23·4	
18	B. 1528	21,117·55	25·02	21·4	
19	B. 6446	12,334·27	12·82	21·6	
20	B. 3747	12,178·14	10·45	19·6	
21	A. 2	11,397·49	13·14	19·7	
22	A. 95	17,954·95	19·30	13·3	
23	Q. 813	14,512·41	25·85	22·2	
24	Q. 116	15,613·00	16·14	19·0	
25	B. 1135	30,289·22	21·46	16·4	
26	B. 625	17,579·47	12·84	20·7	
27	D. 109	17,642·69	17·97	20·6	
28	D. 74	15,300·74	18·74	17·6	
29	White Mauritius	26,229·80	23·48	22·1	
30	Mauritius 33	17,486·56	15·89	20·7	
31	Striped Mauritius	14,832·35	15·26	20·8	
32	Mauritius 16	27,478·88	22·79	21·5	
33	Do 6	10,304·58	8·71	21·6	
34	Ashy Mauritius	24,668·54	23·28	19·1	
35	Mauritius 131	19,516·24	12·54	19·4	
36	Waxy Red	18,111·08	13·59	20·3	
37	White Transparent	14,832·35	17·91	20·5	
38	Striped Tanna	16,862·04	30·52	18·3	
39	Tanna Blanche	17,330·43	19·44	19·4	
40	Tanna Green C. P.	24,356·28	33·10	20·0	
41	Manjave	17,954·95	21·60	21·4	
42	Fiji B.	15,445·87	11·24	19·5	
43	Blue Cane	22,326·59	23·07	19·2	
44	Cavanagiri	14,988·48	9·82	17·0	

TABLE II.

Sugarcane varieties. Indigenous and Hebbal canes. Planted on 21-1-1932. Harvested on 25-4-1933.

Plot B. 4-17 (c).

Serial No.	Variety	Per acre		Brix reading	Remarks
		No. of canes	Wt. of canes in tons		
1	Cheni	27,166·62	7·81	20·4	
2	Hottecheni	34,348·60	10·40	12·1	
3	Bangadya	18,579·47	13·87	16·1	
4	Dhar	43,091·88	11·50	15·7	
5	Khadya Dharwar	36,534·42	14·49	18·5	
6	Qutlikoji	55,894·54	18·31	17·4	
7	Nanal	38,720·24	14·56	19·3	
8	Grass cane Hubli ..	25,917·58	21·74	18·7	
9	Manjava	42,467·36	24·71	20·5	
10	Kabiria	14,363·96	12·78	20·0	
11	Local Rastali	8,587·15	8·29	19·2	
12	Rastali Green Striped ..	14,363·96	15·82	19·2	
13	Red cane Majari	17,486·56	22·58	22·6	
14	Pundya Chik Kerur	21,233·68	14·01	17·6	
15	Thambda Khanapur ..	21,399·81	16·31	19·6	
16	Striped Sabbanahalli ..	10,460·71	7·87	22·6	
17	White Sport Sabbanahalli ..	11,553·62	7·87	19·5	
18	Local Striped	14,363·96	11·36	23·2	
19	H.M. 312	12,022·01	13·17	15·3	
20	H. M. 500 Striped	12,646·53	11·77	22·5	
21	H.M. 332	28,111·08	12·78	18·9	
22	H.M. 601 Striped	24,668·54	21·88	19·1	
23	H.M. 487	14,620·09	12·61	17·5	
24	Striped cane Rabennur ..	6,557·46	3·55	16·5	
25	Karaulia	34,504·73	8·50	19·9	
26	Bauria	22,110·46	1·67	21·5	
27	Hemja	33,411·82	3·34	20·3	
28	Katara	38,720·24	3·76	19·0	
29	Berli	30,913·74	4·04	21·5	
30	Co. 313	8,274·89	14·07	20·4	
31	Co. 301	22,326·59	11·09	21·6	
32	Co. 219	24,980·80	17·98	16·7	
33	Co. 281	37,002·81	15·75	21·1	
34	Co. 205	43,560·27	12·62	19·5	
35	J. 33 a	14,832·35	10·03	20·8	
36	R.M. 27-6	31,069·87	16·56	18·8	
37	H.M. 487-0017	22,326·59	20·77	20·7	
38	J. 33 a-001	18,423·34	19·93	23·4	
39	J. 33 a-004	17,798·82	12·88	22·5	
40	Local Striped 0-0-$\frac{3}{8}$	49,493·21	28·15	17·0	
41	H.M. 165-0-0-5	13,271·05	20·56	18·2	
42	H.M. 320	15,613·00	12·14	23·0	
43	H.M. 544	8,587·15	9·41	19·1	
44	H.M. 553	11,085·23	15·61	20·1	
45	H.M. 500	9,992·32	10·03	21·0	
46	E.K. 28	13,427·18	12·89	21·0	
47	P.O.J. 2878	22,482·72	14·98	20·8	
48	H.M. 544 Striped	7,806·50	7·52	21·9	
49	H.M. 602	23,184·81	12·82	23·1	
50	Red Mauritius	7,806·50	6·62	16·1	

TABLE III.

Sugarcane varieties. Coimbatore and Hebbal Seedling canes. Planted on 6–2–1933.
Harvested on 7–5–1933.

B. Range Plot 2.

Serial No.	Variety	Per acre		Brix reading	Remarks
		No. of canes	Wt. of canes in tons		
1	Red Mauritius	14,904	12·63	16·7	
2	Co. 204	66,792	19·28	20·4	
3	H.M. 210	20,328	19·23	22·8	
4	H.M. 310	2,2264	12·96	22·2	
5	H.M. 542	7,744	12·53	21·3	
6	H.M. 600	7,744	10·15	23·0	
7	H. M. 537	8,228	6·20	20·9	
8	Co. 349	31,460	24·41	20·8	
9	White Mauritius	6,292	3·24	19·3	
10	H.M. 539	14,036	9·51	22·1	
11	H.M. 337	6,776	6·26	21·2	
12	Co. 203	10,164	2·12	17·5	
13	R.M. Striped Hebbal ..	10,164	3·02	21·2	
14	J. 213-16	30,492	24·41	20·6	
15	J. 213–17	14,036	11·23	21·6	
16	J. 213–19	32,912	23·93	21·3	
17	J. 213–26	27,588	15·77	20·4	
18	J. 213–30	20,328	13·39	21·8	
19	J. 213–33	27,588	25·06	21·7	
20	J. 213–35	25,332	15·98	19·8	
21	J. 213–22	25,816	16·42	19·9	
22	J. 213–31	11,616	9·51	21·6	
23	J. 213–32	36,300	34·57	19·8	
24	H.M. 542 Manjri Farm .	2,904	2·54	22·0	
25	H.M. 89–2	9,196	9·51	21·8	
26	H.M. 89–3	8,228	7·56	23·1	
27	H.M. 487–12	37,268	24·41	21·3	
28	R.M. Striped Babbur ..	7,260	5·61	22·8	
29	Co. 1	12,100	6·48	22·5	
30	Co. 201	66,792	23·93	23·7	
31	Co. 202	37,268	12·10	18·9	
32	R.M. Striped Thiravabele ..	15,488	9·29	18·4	
33	Co. 205–8	61,952	35·65	20·0	
34	Co. 206	35,816	10·80	17·6	
35	H.M. 165–1732	39,688	26·78	18·0	
36	H.M. 165–20–32	20,328	13·85	18·2	
37	H.M. 165–30–32	23,232	14·26	19·2	
38	H.M. 165–40–32	32,912	23·14	15·4	
39	H.M. 165–50–32	22,264	18·58	19·0	
40	Co. 201–60–32	56,144	30·25	18·9	
41	Karroer 70–32	1,06,480	22·03	19·0	
42	Karroer 80–32	19,360	16·76	17·7	
43	Karroer 90–33	29,040	17·71	19·6	
44	Co. 206–100–32	1,44,242	26·79	19·9	
45	L.P. 0-0-$\frac{3}{8}$	36,784	19·87	17·6	
46	H.M. 500 Striped	7,744	6·48	18·6	
47	H.M. 608	..	..	27·0%	Tonnage not calculated as all the canes were planted.

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